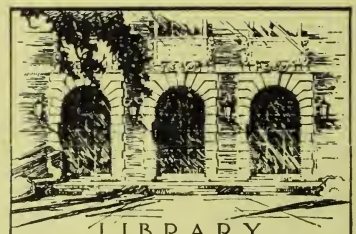

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NATURAL HISTORY
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TRANSACTIONS

OF THE

ILLINOIS STATE HORTICULTURAL SOCIETY

FOR 1876,

BEING

The Proceedings of the Twenty-first Annual Meeting,

HELD AT

GALESBURG, DECEMBER 12, 13 AND 14,

TOGETHER WITH THE PROCEEDINGS OF THE

Horticultural Society of Northern Illinois,

ALSO OF THE

ALTON, WARSAW, GALESBURG, JACKSONVILLE, AND OTHER LOCAL AND DISTRICT HORTICULTURAL SOCIETIES;

FOR THE YEAR 1876.

Embracing Essays and Discussions in all branches of Scientific and Practical Horticulture; Lists of Fruits, Trees and Plants adapted to each Fruit District in the State. Also, an elaborate paper by Prof. Cyrus Thomas, State Entomologist, on the subject of Plant Lice.

EDITED BY THE SECRETARY,

O. L. BARLER, HINSDALE, ILL.

NEW SERIES—VOL. X.

CHICAGO:
PUBLISHED BY THE SOCIETY.
C. E. SOUTHARD, PRINTER, 175 MONROE ST.
1877.

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Nat. Hist. Survey

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OFFICERS FOR 1877.

PRESIDENT:

DR. A. G. HUMPHREY, Galesburg.

VICE-PRESIDENT:

J. W. ROBISON, Tremont.

SECRETARY:

O. L. BARLER, Hinsdale.

TREASURER:

S. G. MINKLER, Oswego.

EXECUTIVE BOARD:

DR. A. G. HUMPHREY.....President, State Society.
O. L. BARLER.....Secretary, State Society.
S. G. MINKLER.....President, Hort'l Society of Northern Illinois.
A. C. HAMMOND.... .....President, Hort'l Society of Central Illinois.
E. HOLLISTER .....President, Hort'l Society of Southern Illinois.
L. K. SCOFIELD.....Vice-President, Hort'l Society of Northern Illinois.
J. W. ROBISON.....Vice-President, Hort'l Society of Central Illinois.
F. HAYDEN.....Vice-President, Hort'l Society of Southern Illinois.

COMMITTEE ON GENERAL HORTICULTURE

FOR 1877.

This committee is expected to report, each for his respective district, of the *status* of horticulture therein, modes of culture and results, the weather and its effects on the development of fruit, adaptation of different species and varieties of trees to different soils, prevalence of insects and remedies for noxious species; in short, report all *facts* which he may be able to collect which will be of benefit to fruit-growers and tree-planters.

(See page xi for bounds of districts.)

1st	District	O. B. Galusha	Morris.
2d	"	Arthur Bryant, Jr.	Princeton.
3d	"	Erastus Childs, B. Whitaker,	Warsaw.
4th	"	Albert Dunlap.	Champaign.
5th	"	B. Pullen	Centralia.
6th	"	Isaac Snedeker	Jerseyville.
7th	"	David Gow	Cobden.

STANDING COMMITTEES.

Gentlemen named on these committees are requested to investigate and report independently, not only such facts as directly affect or are intimately connected with horticultural operations, but also all conditions and circumstances which are related to, have an influence upon or explain existing facts bearing upon horticulture, with a view to arrive at intelligent comprehensions of causes and effects in all departments of scientific and practical horticulture.

GEOLOGY.

Prof. A. H. Worthen, Springfield; Tyler McWhorter, Aledo; Prof. Charles Fairman, Alton.

BOTANY AND VEGETABLE PHYSIOLOGY.

Prof. T. J. Burrill, Champaign; D. B. Wier, Lacon; Ophelia Higgins.

ENTOMOLOGY.

Cyrus Thomas, Carbondale; C. V. Riley, St. Louis; D. B. Wier, Lacon.

ORNITHOLOGY.

Prof. S. A. Forbes, Normal; C. W. Douglas, Waukegan; James E. Starr, Elsah.

ARBORICULTURE.

Prof. J. E. Stewart, Samuel Edwards, Arthur Bryant, Sen.

FLORICULTURE.

Prof. J. V. N. Standish, Galesburg; G. W. Tindall, Upper Alton; Mrs. T. A. E. Holcolm, Cobden.

VEGETABLE GARDENING.

Dr. B. F. Long, Alton; Jonathan Periam, Chicago; H. K. Vickroy, Normal.

ORCHARD CULTURE.

George Hilliard, Brighton; Abner Dunlap, Champaign; W. T. Nelson, Wilmington.

VINEYARD CULTURE.

T. J. Hale, Galesburg; James Crow, Crystal Lake; Fred. Hayden, Alton.

BERRY CULTURE.

B. F. Draper, Upper Alton; R. M. Hunt, Galesburg; C. N. Dennis, Hamilton.

UTILIZING OF FRUITS.

Thos. S. Leslie, Ipava; D. F. Kinney, Rock Island; A. M. Brown, Villa Ridge.

METEOROLOGY.

Prof. J. B. Turner, Jacksonville; Prof. John H. Tice, St. Louis, Mo.; H. H. McAfee, Freeport.

LANDSCAPE GARDENING.

Dr. J. M. Gregory, Champaign; T. J. Hale, M. D., Galesburg; Hon. J. M. Pearson, Godfrey.

FARMERS' HORTICULTURE.

Tyler McWhorter, Aledo; O. L. Barler, Hinsdale; J. T. Johnson, Warsaw.

FRUIT OR HORTICULTURAL DISTRICTS.

I. NORTHERN ILLINOIS.

1. *Fox River District*—Boone, Cook, DeKalb, DuPage, Grundy, Kane, Kankakee, Kendall, Lake, LaSalle, McHenry, Will.—12.

2. *Rock River District*—Bureau, Carroll, Henry, Jo Daviess, Lee, Ogle, Putnam, Rock Island, Stephenson, Whiteside, Winnebago.—11. Total, 23.

II. CENTRAL ILLINOIS.

3. *Illinois River District*—Adams, Brown, Cass, Fulton, Hancock, Henderson, Knox, McDonough, Marshall, Mason, Mercer, Menard, Morgan, Peoria, Pike, Schuyler, Scott, Stark, Tazewell, Warren, Woodford.—21.

4. *Grand Prairie District*—Champaign, Christian, Coles, DeWitt, Douglas, Edgar, Ford, Iroquois, Livingston, Logan, McLean, Macon, Moultrie, Piatt, Sangamon, Shelby, Vermillion.—17. Total, 38.

III. SOUTHERN ILLINOIS.

5. *Centralia, or Wabash District*—Clark, Clay, Crawford, Cumberland, Edwards, Effingham, Fayette, Franklin, Hamilton, Jasper, Jefferson, Lawrence, Marion, Richland, Wabash, Wayne, White.—17.

6. *Alton, or Kaskaskia District*—Bond, Calhoun, Clinton, Greene, Jersey, Macoupin, Madison, Monroe, Montgomery, Perry, Randolph, St. Clair, Washington.—13.

7. *Grand Chain District*—Alexander, Gallatin, Hardin, Jackson, Johnson, Massac, Pope, Pulaski, Saline, Union, Williamson.—11. Total, 41. Grand Total, 102.

LIST OF MEMBERS

FOR 1877.

NAME.	RESIDENCE.	STATE.
Arnold B. F.	Galesburg	Illinois.
Beaty David	Jerseyville	do.
Blair J. L.	Alton	do.
Blanchard & Bailey	Rock Island	do.
Bryant Arthur, Sen.	Princeton	do.
Bryant Arthur, Jr.	do.	do.
Bubach J. G.	do.	do.
Brown R. M.	Normal	do.
Brown H. D.	Hamilton	do.
Baldwin Isaac	Jacksonville	do.
Barler O. L.	Hinsdale	do.
Barnes J. E.	Kirkwood	do.
Bassett L. J.	Galesburg	do.
Brubacker J. P.	Nachusa	do.
Cochrane J. W.	Blue Island	do.
Cooley E. A.	Galesburg	do.
Carpenter A. N.	do.	do.
Childs E.	Oneida	do.
Dennis C. N.	Hamilton	do.
Daniels L. E.	Mason	do.
Duerson A. L.	Galesburg	do.
Edwards Samuel	Mendota	do.
Fulkerson Col. W. H.	Jerseyville,	do.
Flagg W. C.	Moro	do.
Gaston A. H.	Lacon	do.
Gaston J. R.	Normal	do.
Galusha O. B.	Morris	do.
Graves H. C.	Sandwich	do.
Gatchell A.	Quincy	do.
Hammond A. C.	Warsaw	do.
Hays D. H.	Aledo	do.
Hale T. J.	Galesburg	do.
Hayden Fred.	Alton	do.
Hoffman D. E.	Winchester	Indiana
Hunt R. W.	Galesburg	Illinois.
Humphrey Dr. A. G.	do.	do.
Hoff O. W.	Wataga	do.
Hollister E.	Alton	do.
Jackson Wm.	North Alton	do.
Kimmons Ira	Liberty	do.
Kinney D. F.	Rock Island	do.
Leslie Thos.	Ipava	do.
Lindblud Andrew	Princeton	do.
Long Dr. B. F.	Alton	do.
Lyon L. W.	Alton	Illinois
Mann W. H.	Gilman	do.
Martin Geo. A.	Buffalo	N. Y.
McGinnis Wm. T.	North Alton	Illinois.
Minkler S. G.	Oswego	do.
Mygatt Dr. E. G.	Richmond	do.
Mead H. M.	Peoria	do.
McWhorter Tyler	Aledo	do.
McWhorter A. L.	Altoona	Iowa.
McAfee Prof. H. H.	Freeport	Illinois.
Nourse W. A.	Moline	do.
Nichols F. K.	Alton	do.
Pratt W. A.	Elgin	do.
Powell Robt. D.	Jerseyville	do.
Powell Anna	do.	do
Pollock Mrs. C. E.	Aledo	do.
Pennington L. S.	Sterling	do.
Rogers J. S.	Marengo	do.
Robison J. W.	Tremont	do.
Ross L. F.	Avon	do.
Richmond I. J.	Alton	do.
Robbins E. S.	Galesburg	do.
Stewart J. T.	Peoria	do.
Sisson H. M.	Galesburg	do.
Snedecker Isaac	Jerseyville	do.
Starr James E.	Elsah	do.
Shepherd Smiley	Hennepin	do.
Standish Prof. J. V. N.	Galesburg	do.
Scofield D. C.	Elgin	do.
Scofield L. K.	Freeport	do.
Scott D. W.	Galena	do.
Terry J. W.	Viola	do.
Tubbs Dr. H.	Kirkwood	do.
Tull Jno. R.	Fruitland	do.
Vickroy H. K.	Normal	do.
Vernon Marion	Aledo	do.
Whitney A. R.	Franklin	do.
Wiswell Royal	Galesburg	do.
Worthen Prof. A. H.	Springfield	do.
Wolf John	Liberty	do.
Wier D. B.	Lacon	do.
Williams H. W.	Galesburg	do.
Wright Wm.	Ipava	do.
Willett R. S.	Malcolm	do.

HONORARY MEMBERS.

Dr. J. A. Warder, North Bend, Ohio; Prof. J. H. Tice, St. Louis; Prof. C. V. Riley, St. Louis; B. A. Matthews, Knoxville, Iowa; Dr. Wm. LeBaron, Geneva, Ill.; Prof. J. B. Turner, Jacksonville, Ill.; Prof. H. H. McAfee, Ames, Iowa; J. S. Stickney, Wauwatosa, Wis.; Suel Foster, Muscatine, Iowa; Dr. Allen Furness, Danville, Ind.; O. S. Wiley, Benton Harbor, Mich.; Dr. J. M. Gregory, Champaign, Ill.; J. H. Nicholson, Bridgeport, Ind.; Prof. Cyrus Thomas, Carbondale, Ill.; J. M. Stewart, Macon, Mo.; V. C. Barry, Rochester, N. Y.; H. B. Elwanger, Rochester, N. Y.; E. H. Calkins, Iowa.

CONSTITUTION AND BY-LAWS

AS AMENDED AT THE ANNUAL MEETING, 1874.

CONSTITUTION.

I. This Association shall be known as the ILLINOIS STATE HORTICULTURAL SOCIETY.

II. Its object shall be the advancement of the science of Pomology and of the art of Horticulture.

III. Its members shall consist of *Annual* members, paying an annual fee of one dollar; of *Life* members, paying a fee of twenty dollars at one time; and of *Honorary* members, who shall only be persons of distinguished merit in Horticulture or kindred sciences, who may, by vote, be invited to participate in the privileges of the Society. The wives of members shall be members without fee.

IV. Its officers shall consist of a President, one Vice-President and Secretary, who shall be elected at the annual meeting, and serve until their successors are chosen; also, an Executive Board, as hereafter provided.

V. The affairs of the Society shall be managed by an Executive Board, to consist of the President and Secretary of the Society, and the President and one Vice-President from each of the three District Horticultural Societies of the State.

VI. The Society shall hold annual meetings, and publish its transactions annually, *provided* there are sufficient funds in the treasury to defray the expenses of publication.

VII. This Constitution may be amended at any regular meeting, by a two-thirds vote of the members present.

BY-LAWS.

I. The President shall preside at all meetings of the Society; call meetings of the Executive Board, and, under its direction, have a general superintendence of the affairs of the Society, and direction of the expenditure of money; he shall deliver an annual address upon some subject connected with Horticulture, and shall appoint all special committees, unless otherwise ordered.

II. The Vice-President shall preside at the meetings in the absence of the President.

III. The Secretary shall conduct the correspondence of the Society, have charge of its papers, books and reports, and prepare its reports for publication; and shall receive, for so doing, his necessary expenses for postage, stationery, printing, expressage and office rent, and the sum of three hundred dollars per annum; he shall render an annual account in detail of such necessary expenses, which shall be referred, with the Treasurer's report, to a special auditing committee.

IV. The Treasurer shall receive and keep an accurate account of all moneys belonging to the Society, and disburse the same upon the written orders of the President, which he shall retain and file as vouchers; he shall make an annual report to the Society of the receipts and disbursements, which, with the vouchers, shall be referred to a special auditing committee appointed at the annual meeting. Before entering upon his duties, he shall give bond to the Society, in the sum of five thousand dollars, for the faithful performance of his duties; such bond to be approved by the Executive Board.

V. The Executive Board shall perform all the duties required of them by section four of the "Act re-organizing the State Horticultural Society," approved March 24, 1874. They may appoint such standing and other committees as they may deem advisable.

VI. These By-Laws may be altered at any regular meeting, by a two-thirds vote of the members present.

SYNOPSIS OF STATE LAWS,

AFFECTING HORTICULTURE.

1. An Act approved Feb. 26, 1861, provides with fine of from ten to fifty dollars and imprisonment not exceeding twenty days for entering an inclosure and taking or destroying fruit.

2. An Act approved Feb. 16, 1865, is a re-enactment of the above, (No. 1).

3. An Act approved Feb. 16, 1865, provides that any one injuring or destroying any fruit or other trees, shrubs, etc., of another, shall be fined not exceeding five hundred dollars and imprisoned not more than three months—or both.

An Act to encourage the Planting and Growing of Timber.

(Approved February 9, 1874. In force July 1, 1874.)

Section 1. *Be it enacted by the people of the State of Illinois represented in the General Assembly*, That it shall be lawful for the Board of Supervisors, or County Commissioners' Court, in any county in this State, to offer a bounty to any person in said county who shall hereafter plant one or more acres of land with forest trees, and properly cultivate the same for three years, any sum not to exceed $10 per annum for three years for each acre so planted and cultivated; *provided*, that trees so planted shall not be at a greater distance than ten feet apart each way.

Sec. 2. Any person claiming the bounty under this act, shall make proof before the county clerk that he has complied with section 1 of this act, and that the trees planted by him are in a healthy and growing condition.

Sec. 3. Upon proof of a compliance with this act the county clerk shall issue his certificate to the person entitled to the same, setting forth that the provisions of this act have been complied with, and the number of acres so planted.

Sec. 4. The Board of Supervisors, or County Commissioners' Court, desiring to offer the bounty herein provided for, shall do so by resolution, to be made of record, and giving notice in some newspaper published in the county three weeks prior to the first day of April of each year; said resolution and notice to state the amount of bounty offered for each acre planted and cultivated.

An Act making an appropriation in aid of the Illinois State Horticultural Society.

Be it enacted by the people of the State of Illinois represented in the General Assembly, That there be appropriated for the use of the Illinois State Horticultural Society the sum of two thousand dollars per annum, for the years 1877 and 1878, to be expended by said Society for the purposes and in the manner specified in "An Act to re-organize the Illinois State Horticultural Society," approved March 24, 1874.

REPORT TO THE GOVERNOR.

To His Excellency, Shelby M. Cullom, Governor of Illinois:

I have the honor, herewith, to present to you the Tenth Volume of the New Series of Reports of the Illinois State Horticultural Society, and trust that you will be able to see in them indications of the spirit of progress that animates the horticulturists of this great State. The necessity of practical and scientific knowledge in horticultural matters is becoming more and more apparent. The difficulties in the way of success are on the increase, and only the utmost diligence in culture and constant warring with insect enemies saves the harvest to the husbandman.

There is a good degree of interest manifested in our meetings, and no letting up in the determination to make this one of the greatest agricultural and horticultural States in the Union.

The Transactions of our Society are distributed, not only among active horticulturists, but, by the instructions of our Board, are donated to the public school libraries, as far as our means will allow. We thus think to do missionary work and enlarge the sphere of usefulness of the Society, which cannot but result in much good to the State.

Your obedient servant,

O. L. BARLER,

Secretary State Horticultural Society.

Hinsdale, June 30, 1877.

PROCEEDINGS

OF THE

TWENTY-FIRST ANNUAL MEETING

HELD AT

GALESBURG, DECEMBER 12, 13 AND 14, 1876.

The Illinois State Horticultural Society convened for its twenty-first annual session in the city of Galesburg, on Tuesday, December 12, at ten o'clock, A. M.

The President of the Society, A. C. HAMMOND, of Warsaw, called the Society to order and presided over the deliberations of the meeting.

Prayer was offered by the Rev. S. A. GARDNER, of Galesburg.

ADDRESS OF WELCOME.

Prof. J. V. N. STANDISH, of Lombard University, Galesburg, addressed the Society as follows:

Mr. Hammond, President of the State Horticultural Society:

Welcome! thrice welcome to our city! In behalf of the Galesburg Horticultural Society, I bid you, and the Society of which you are the honored head, welcome! In behalf of our city, in behalf of all elevating and refining influences, whatever they may be; in behalf of every æsthetic art and feeling, and in the name of a higher and more symmetrical culture; in the name of a grander, nobler, broader education, I bid the members of this great Society, in which is represented the horticultural interests of this great State, each and all of you, a cordial welcome!

You are the almoners of gifts to unborn generations. Your works shall praise you, and children's children shall call you blessed. Your

names may never be written high on the scroll of fame, you may never eat and drink with princes, nor dwell in "lordly halls;" yet your deeds shall never perish. Their influence shall live forever. Although the decree may never go forth that you are to tread halls of senates, and be contaminated with fetid odors of political atmospheres, yet a nobler destiny is yours. By the magic of your power the fields shall clothe themselves in garments of beauty, and the desert shall blossom as the rose.

It has been said that he who causes two spears of grass to grow where only one grew before, is a public benefactor. The man who plants a tree, provided it is not a *soft maple*, is nobler than he who taketh a city. His deed shall live after him, bringing joy, and not sorrow. He who, by his art, shall make the earth bring forth her increase in its greatest abundance, is a public benefactor. He who shall teach his neighbor *how* to destroy the army of noxious insects that are preying upon his fruit and his grain, is a public benefactor. The man who shall instruct his fellow men *how* to make their homes beautiful and attractive, the abodes of comfort and contentment, is the greatest of benefactors. You, Mr. President, stand as the representative of a society of such men. We welcome you as public benefactors. We hail you as noble teachers of the people. A higher civilization, a grander culture, a sublimer ideal of a better life, bid you God speed in your unselfish and important work.

Not many years ago this beautiful State of Illinois was seemingly a vast wilderness. The traveler, in passing from its northern to its southern, from its eastern to its western boundaries, would discover scarcely the semblance of civilization. Only here and there, scattered on the broad open prairies, might be seen the dwellings of the tillers of the soil. How wonderful the change! Where wild nature held unlawful sway, you now behold the footprints of the husbandman. What, let me ask, has wrought this so radical change? It is culture. What has erected the beautiful homes that are scattered everywhere throughout the length and breadth of our State? The hand of culture. Whence came these cities and villages, where but yesterday the prairie wolf roamed and lived unscared? By the hand of culture. How came these fields of beauty, burdened with growing corn and waving grain? By the hand of culture. What has filled our granaries and homes with the comforts and necessaries of life? It is the industrious hand of culture.

Twenty years have completed the full measure of their cycles; twenty times have seed time and harvest come and gone, since this Society had its birth. Who, Mr. President, shall tell the good it has accomplished?

Who shall gather up the horticultural experiences of these years and compute their just value? Who shall number the days and hours that thought has been busy in beautifying home and field; in making the earth yield her rich treasures for the pleasure and comfort of man? It is not my purpose to magnify the works of horticulturists. I do not stand here with that intention. In classic language, let me say, *Si monumenta quæris, circumspice.* If you seek monuments, look around. Yea, more. If you seek praise, behold your works. These shall praise you, even unto the latest generation.

And as I stand here, in the presence of noble men, I would not forget the honored dead, who but a short time ago were with us. To the members of this Society the names of a HULL, a LEBARON, a WALSH, a DUNLAP, a HUGGINS, an OVERMAN, are hallowed names; and their memories shall ever be green in our heart of hearts. Their labor of love is ended. Their work is finished. No more shall we hear their voices, as of yore; no more shall we be guided by their counsels. Though they are dead, yet they speak to us. Methinks I stand in their presence once more, and can discern their well-known looks. Methinks I can hear their well-known voices, speaking forth wisdom and truth. I fancy that I can see them standing in the open portals of Heaven, urging us on in the grand work of improvement, and beckoning us to come up higher. Thus shall it ever be. The worthy deeds of noble men shall ever be our exemplars. Let, then, our high aim be to perform life's work nobly, faithfully, fearlessly, grandly; and the welcome plaudit shall be heard, *Well done!*

RESPONSE BY THE PRESIDENT.

President HAMMOND then responded to Prof. STANDISH'S words of welcome, in the following appropriate manner:

The rapidly moving wheels of time have again brought us to our annual meeting, and as we look back upon the year just drawing to a close we realize that it has been one of more than ordinary vicissitudes. "God has blessed the land," the orchard and vineyard have yielded their burden of fruit, and the "valleys have been covered over with corn." Yet, there has been blasting and mildew, floods and insect depredations. Sickness has come, and been healed in some of our homes, in others it has ended in the "dark valley." The insatiate "archer" has once, and again, yea thrice, sped his shafts at loved ones, and we shall never more greet them this side the silent river.

Early in March last, B. G. Grover, a member of this Society, and a prominent member of the Warsaw Horticultural Society, was called from time to eternity.

On the 11th of the same month, Jonathan Huggins, the honored Treasurer of this Society, heard the Master's summons, "Come up higher," and passed to his reward. In him we have lost a faithful friend, and the Society an earnest worker.

On the 14th of October, Dr. Wm. LeBaron yielded back to the Giver a life that, by reason of a severe mental disorder, had become a burden. As State Entomologist, and member of this Society, he had made numerous acquaintances throughout the entire State. And the knowledge of the great sorrow of his latter days and his untimely death has saddened many hearts.

I deem it appropriate for this Society to appoint a committee to prepare suitable resolutions and testimonials of respect, and take such other action as may be thought best, to show our appreciation of the deceased.

We meet to-day under circumstances that will insure a pleasant and profitable meeting. As the mind reverts to our meeting, at this place, six years ago, and the generous hospitality with which we were received, we are assured that the greeting which we receive to-day is something more than idle words.

This beautiful city, with its noble institutions of learning, its numerous churches, its luxurious residences surrounded with tasteful gardens and lawns, is no stranger to us; and we rejoice that we have the opportunity to mingle with this cultured people, and shall return to our homes benefited by our sojourn with them.

And we hope that our coming among them may not be without its compensation, but in years to come it may appear that we have sown some good seed, that has sprung up and yielded a bountiful harvest.

We also hope to meet here many of the old veterans who assisted in the organization of the first horticultural societies of the West, and have for two or three decades labored incessantly for the advancement of their favorite science.

We trust that this reunion will be one of great interest to these fathers in horticulture, and of profit to the younger members of the Society, who will listen with profound attention to the words of wisdom that may fall from their lips.

In this connection, I would suggest that a committee be appointed, at an early day, to prepare a programme, and make other necessary arrangements, for the anniversary meeting which will occur on Thursday evening.

FINANCIAL STATEMENT.

President HAMMOND then made the following brief financial statement:

Not having the data from which to compile a detailed financial report, I can only speak in general terms of the financial condition of the Society.

The warrants paid by our late Treasurer, between December 16th and March 1st, of the fiscal year, were:

1875.

Dec. 16	No. 69—To C. E. Southard, for printing	$ 19 75
Dec. 16	No. 70—To O. B. Galusha, balance on all accounts	291 17
Dec. 16	No. 71—To Louis Miller, express and fires for Board	4 00

1876.

Jan. 4	No. 72—To O. L. Barler, for reporting	65 00
Feb. 7	No. 73—To Baker & Co., for engraving	13 88

On the 1st of March the Treasurer's account showed a balance in our favor of $2,904.75. On the 11th of that month he was suddenly called away.

Immediately after hearing of his death, your Secretary visited the family in the interests of the Society. He found that Mr. Huggins had not kept a separate bank account, as Treasurer of the State Horticultural Society, but deposited the funds in his own name, and that his account showed a balance in his favor of only $700.00. As the publisher's bill was then due, I deemed it necessary to call a meeting of the Executive Board, to arrange for the payment of this bill, and otherwise consider the situation.

At this meeting, held at Normal on the 28th of March, the Secretary reported that the son of the late Treasurer, who administers on the estate, had assured him that the $700.00 in bank should be paid as soon as the necessary order of court could be procured, and that we could depend upon an additional amount—sufficient, at least, to liquidate the indebtedness of the Society—within sixty days.

Five members of the Board, therefore, volunteered to advance the sum necessary to pay the publisher. W. T. Nelson was then appointed Treasurer, after which the Board adjourned.

Having, up to August 1st, received but $609.00 from the administrator, and having no assurance of further immediate payment, I again called the Board together, at Chicago. After carefully considering the subject, they directed me to repair at once to Carlinville, and thoroughly investigate the condition of the estate of the late Treasurer, as well as

of the securities; and, if the interest of the Society demanded it, to commence suit immediately. After carefully looking over the ground, examining the records and counseling with an attorney, it seemed best to postpone legal action for the present. Since that time we have received $550.00, leaving still due $1,745.75.

It is but just and proper, in this connection, to say that the family of our deceased Treasurer assure me that the Society shall never lose a cent by their misfortunes.

IN MEMORIAM.

Following the above reading of the general statement of the finances, and an announcement of the sudden death of our late Treasurer, Jonathan Huggins, of Woodburn, the members of the Society indulged freely in voluntary expressions of their faith and confidence in the integrity and good intentions of the late Treasurer. While all felt that it was unfortunate that he had not kept a separate bank account with the Society, which would have simplified and hastened the settlement of our financial matters; still, there was no one who did not express the belief that the funds of the Society would be paid over at the earliest possible moment.

Dr. HUMPHREY, of Galesburg, said that he remembered with pleasure the days and years in which we were associated with Mr. Huggins. He never failed, for a period of nearly twenty years, to meet with us. As sure as the year rolled around, so sure was friend Huggins in his place. He had given his life to the interests of horticulture, frequently writing for the press upon horticultural subjects, and always ready to speak from practical experience and with profit to those who heard his words. In his death this Society has met a great loss, as an earnest co-worker in all horticultural matters. He fully believed that Mr. H. was a strictly honest man, and that the Society would not lose any money by his sudden death. We have the assurances of the family and administrators that all shall be paid at an early day.

Messrs. MINKLER, SCOFIELD and HAMMOND expressed the same cordial and confident feelings. All had faith in the man, and all expressed deep sympathy with the bereaved family, and entire faith that they would, as they said, see that our Society lost nothing.

REPORT ON GENERAL HORTICULTURE.

The PRESIDENT announced that he would postpone till afternoon the appointment of special committees; and he proceeded at once to call for the Reports on General Horticulture.

REPORT FROM THE FIRST DISTRICT.

J. S. ROGERS reported for the First District as follows:

Mr. President:

I will open my report by giving the "mean temperature" for the months of November, December, January and February, of 1873–74–75 and '76, as recorded by John W. James, Marengo, Ill., "Volunteer Observer," Signal Service, U. S. Army:

	1873-4.	1874-5.	1875-6.	1876.
November	27.6	32.3	30.1	32.8
December	25.8	23.4	30.6	.....
January	20.2	5.5	25.5	.....
February	23.2	4.7	24.9	.....
Mean, four months	24.2	16.4	27.7	.....

The winter of 1875–6 was the mildest we have had in several years, and the preceding summer was not as dry as the two former seasons, the ground being drenched with copious rains at short intervals. These two causes were directly, or indirectly, the reason of so large a crop of fruit all over the country. As far as I can learn, in every direction, there has not been so large a yield of apples in years—so much so that they are almost a drug in the market. The soil and location did not seem to cut any figure in the amount of the crop, although in orchards on cleared timber land the fruit dropped badly, owing to a drouth in the month of August. The fruit was of good size and sound in most cases, except where affected by Codling Moth. From present appearance apples are not likely to keep over the winter, and any one who is successful in getting the crop through till April and May will doubtless find a ready market and good prices.

The cherry trees blossomed full, but were blasted by an east wind, that continued several days, just at the time of the "setting" of the fruit, so that the crop was next to nothing.

Small fruits were nothing to boast of, although strawberries and raspberries did tolerably well, and fruit of good quality. Plums gave promise of a good crop, but were cut short by Curculio. Grapes promised well during the earlier part of the season, but wet weather in September caused them to rot badly on the vines, and prevented them from maturing their fruit. I would add, in this connection, that the Concord is the standard variety with us.

On the sixteenth of March last we were visited with a heavy rain, that froze as fast as it fell, covering everything with ice, so much so that trees one to one and one-half inches in diameter were laid flat on the ground. You can judge something of it when I state that limbs no larger than a pencil, when covered with ice, would "calipre" one and a quarter inches, and sections of telegraph wire twelve rods long, broken down by the weight of ice, weighed 360 pounds. This caused consider-

able dismay, as everybody supposed that thousands of trees would be ruined; but, in most cases, instead of being a damage, it proved a benefit, as in the case of deciduous ornamental trees, breaking away the rank, straggling growth, which necessitated some trimming up to put into good shape, leaving the trees in better form than before. The ice remained eight days, doing little or no damage to fruit and evergreen trees.

In our vicinity the only insect enemy we have worth mentioning, aside from the Curculio, is the Canker-worm. There is something peculiar in the habits of this pest. Where it once gets a foothold, if not eradicated by artificial means, it will, in time, ruin an orchard, although it does not seem to extend its ravages from one orchard to an adjoining one, unless everything is favorable. As far as my observation extends, I think the Canker-worm will not work or will not put in an appearance where the ground is kept under good cultivation; furthermore, I will say, that in our immediate vicinity this pest has been less destructive the past season than since it first commenced work, some eight years ago.

Despite all the drawbacks, we have been blessed the past season with such a bountiful crop of fruit that we have reason to rejoice and look upon the bounty with Joel Benton, who says:

"Twice a year some powerful fairy holds her wand of enchantment over the benignant orchard until the hill-side stands fairly transfigured. Who will be rash enough to say when it gives us the most delight—when it holds up its mammoth bouquets in May, or when it bears for us its solid bounty in October? At the two gateways of summer it stands with outstretched arms, proffering in the left hand a flowery benediction, in the right a glowing cornucopia—in both a spectacle of wonder. What a burden of subtle associations cling to this period. The flowery apple bough may well baffle the skilled florist, with all his art, to match it, and it is a theme which, best of all, befits the artist's easel.

"In the fall we pass the same spot to find the enchantment merely changed. The trees are now opulent with their shiny, waxy freight, or the ground around the venerable boles is up-piled with pyramids of beauty. It is the hazy October day; there is a wild hush in the air; a halo covers the off-lying hills as with a garment; the work of the year is ended; and from the ancient boughs, redolent of the memories of past generations, and ripe with the sunniness of a hundred summer days, sweeps down upon you a breath that might have come from the Fortunate Islands. Nature furnishes nowhere else in all her gallery two more memorable match-pieces than those of the orchard in May and October. It needs no subtle seer, like Swedenborg, to read the parable or divine the moral correspondence. Happy is he whose life exhibits the same glory, or who shall be able some time to say, with the delicious quaintness of Marvel:

"'What wondrous life is this I lead?
Ripe apples drop about my head;
The luscious clusters of the vine
Upon my mouth do crush their wine;
The nectarine and the curious peach
Into my hands themselves do reach.'"

I have corresponded with parties in the twelve counties composing my district, but have received but the following six reports:

Mr. L. E. Daniels, of Centertown, Grundy county, writes:

"As regards *Apples*, the crop was heavy and of splendid quality, large size and not wormy. Orchards here are mostly in grass, and a portion of them used for hog pasture in the early season.

"*Cherries* were an enormous crop, and as our soil is a deep black muck they do best in grass.

"There was a large crop of *Small Fruits*. In this section the Philadelphia and Purple Cane *Raspberries* taking the lead. Good cultivation paying in all small fruit crops. No noxious insects to do any damage, except the Tent caterpillar in the early season."

Mr. D. C. Scofield, of Elgin, Kane county, writes:

"I hoped to have had opportunity to have rendered you more effectual aid by more inquiry, but will afford you such as I have been able to collect.

"The *Apple* crop has exceeded any former crop in abundance in all localities; while orchards on prairie lands have exceeded their usual crops, yet even this excess has been small as compared with orchards on "barren" or "timber" land, where the crops were very abundant. In some of the orchards of the latter class the Newtown Pippin and Northern Spy are regular and abundant bearers, in some instances the Northern Spy trees averaging more than twelve bushels per tree. The location and soil, *not* the special cultivation, affected these two named varieties of fruit, as the crops of these kinds are abundant, more or less, annually.

"The Canker-worm has been *less* destructive the past year than in several previous years, owing, probably, to the excessive rains in the early season, or that their time of visitation is drawing to a close."

Mr. S. G. Minkler, of Oswego, Kendall county, writes:

"The *Apple* crop has been a bountiful one, though some varieties disappointed growers; prices ranging from ten to twenty-five cents, and hundreds of bushels not gathered.

"*Cherries*, heavy crop, and very fine; no sale; went to market once, and could not get enough to pay for picking, and gave it up.

"Had probably fifty bushels of *Currants* and the same of *Gooseberries*.

"Not worth while to mention *Pears*.

"Less insects and less blight this year than formerly. Climate, past season, all right."

Mr. H. C. Graves, of Sandwich, DeKalb county, writes:

"The *Fruit* crop in this county has been good. *Apples* in some localities were scabby, and some varieties were so everywhere; but, altogether, the crop was the largest for several years.

"Very few *Pears*, from the fact that the late hard winters and the blight, together, have left us but very few trees.

"Early Richmond *Cherries* in abundance.

"*Grapes* a medium crop, with but few perfect bunches; the wet hot weather causing them to mildew and drop off.

"*Blackberries* plenty, large and fine.

"*Raspberries*, full average crop. Turner's Seedling very popular with those that have it.

"*Strawberries* were very fine, but too much rain-fall at time of ripening to save the crop in good condition."

Mr. E. C. Hathaway, of Ottawa, LaSalle county, writes:

"In relation to the subject matter of your inquiry, in answer I must be brief, as I have had little time to make the necessary inquiries in this section; but I will endeavor to give a few general notes, however, as they have come under my own observation.

"The winter of 1875–76 was unusually mild in this section, and the season previous to this having been a moist one all the *Trees*, *Vines*, *etc.*, that had not succumbed to the extreme drouth of the four years previous made unusal growth; consequently, the inflorescence last spring was much more profuse than ordinary, and nearly all fruits seem to have set very full.

"Early Richmond and other *Cherries* of that class bore very full crops of fruit of unusal excellence. Common Morello, however, neither bloomed much nor set any fruit; they appear to be very badly diseased, and are quite used up in this locality.

"*Apples* were very abundant, but a great many were very badly scabbed. Rambo, Rawles' Janet, American Summer Pearmain, Little Romanite, and many others, were nearly destroyed by the scab; but Duchess of Oldenburg, Maiden's Blush, Keswick Codlin, Ben Davis, Willow Twig, Wagener, Baldwin and Westfield Seek-no-further were very fine. The *Apple* crop, at this writing, is rotting badly here, and I learn that such is the case in nearly all localities—even in other States as well.

"*Currants* and *Gooseberries* bore a good crop of fine fruit.

"*Strawberries* from new plantations better, in all respects, than usual, and they also brought better prices than for some years past.

"*Grapes* were not as good as they have been some other years, being scattering on the bunches and many varieties rotting. The Concord has not behaved as well as usual, but, on comparing it with other varieties, may say it has held its own. Parkins and Diana, good; Rogers' Hybrids, as well as Catawba, and many others, almost utter failures—from rot principally.

"*Raspberries* of all classes a fair, but not large, crop of fruit of good quality.

"*Pears* a fair crop; most of the fruit excellent. The blight is playing sad havoc with most of the trees in many places in this district.

"Please have the question brought up and discussed at the Society meeting in relation to the linseed oil remedy. I am watching a number of trees in a gentleman's garden, where the trees were badly blighting, and were painted with the oil; and it has seemed to arrest it, even where the trees seemed hopelessly gone. It was so late in the season when this occurred that I will not be able to report final results before another season.

"Insects were not as numerous as usual, and so but little damage came from that quarter. Except a few days in the spring, I saw but few Potato Beetles during the entire season.

"The Borer (*Saperda bivittata*) seems to have worked about as usual this year, only where the hot soft soap was applied in the latter part of May. Upon examination of such trees this fall, can find no Borers.

"Very few Codling-moth this season—which fact is undoubtedly due to absence of a crop of apples the year previous.

"Leaf-rollers plenty and increasing; can find no remedy better than thoroughly hand-gathering after leaves drop in fall.

"So far as prices for all products of the orchard, field and garden are concerned, I think they have been considerably above the average the past season, with the exception of apples. This crop has hardly paid for marketing; but I think that those who have varieties which *will keep* may yet realize good prices in the spring."

SAMUEL EDWARDS, of Mendota, LaSalle county, writes:

"The *Apple* is our only orchard fruit extensively cultivated. A very large per cent. of orchard trees were fatally injured by the severe winter of 1874–75, which had been preceded by several years of comparative drouth; the damage is greatest in orchards which had been closely pastured by hogs.

"Will it pay to mulch for winter protection, with the precaution of banking with dirt around the bodies of trees, to keep off mice?

"The Borers are ruining many orchards. Trees need to be examined every fall and spring for them, but are generally neglected. Any wash of alkali, tried by me, has proved ineffectual to prevent deposit of eggs. How would it do to wrap trees with any cheap material? I am wrapping some trees with India floor matting to protect from rabbits, and intend leaving it on to shut out the Beetle from laying eggs in the bark. Canker-worms are reported to be in Lamoille, Bureau county.

"The crop of *Apples* this year was large, and a great amount of cider was made—generally kept for vinegar. Most orchardists in this region were of the opinion that apples would continue to sell at low prices, and did not secure them as usual. Severe frosts, about the middle of October, injured many. Winter apples were sold at from twenty-five to forty cents per bushel; now retail in Mendota at $1.00. Years since we made it our practice to begin gathering winter apples the last half of September, leaving those ripening late (as Rawles' Janet) until the last. The Stark apple promises to be an early bearer. Verry Aldrich writes me that it is as good a keeper as Willow Twig or Ben Davis, and a better apple than either.

"*Peaches* are but little grown; gave a moderate amount of fruit. W. E. Chapin, of LaSalle, has a seedling peach, pronounced by F. K. Phœnix and others, who have tested it, to be very fine; it is unusually hardy in tree, and has borne well for the last five years.

"Lombard *Plums* bore heavily, but most of the fruit rotted before maturity. Miner is beginning to bear, and promises well.

"*Small Fruits* of all kinds were abundant, and, with the exception of Cherries, Currants and Gooseberries, sell in our markets at remunerative prices.

"Long-bunched Holland *Currants* were gathered plump and fresh October 2d.

"Green Prolific still proves one of our best *Strawberries*.

"Downing's Seedling is a very desirable *Gooseberry*.

"Planting of *Evergreens* (for shelter) and ornamental trees and shrubs is gradually on the increase. The season has been very favorable for growth of newly set trees and plants."

Before closing, I wish to second the suggestion of Mr. Periam in his report of last year, that a supply of printed forms or blanks be furnished this committee, to be used in their correspondence for collecting the information desired. I would further suggest that they be in the shape of questions covering the subject; and if each question is answered fully we can then have a full report. I am of the opinion that this matter is worthy the attention of this meeting.

Respectfully submitted.

J. S. ROGERS.

MARENGO, Ill., December, 1876.

DISCUSSION ON THE REPORT.

Mr. McWhorter (of Mercer county) inquired what varieties of cherry trees were most affected by the winter. Some varieties are more hardy than others. It had been the result of his observation that the English Morello variety was less hardy than the Early Richmond. Is that the general experience?

Mr. Rogers (of Marengo) replied that they did not have the English Morello. He thought it was a common mistake to confound the English Morello with the Black Morello.

Dr. Humphrey (of Galesburg)—The Black Morello froze to death with us in Knox county in the winters of 1872–3—large trees were killed outright—while the Early Richmonds stood the winters well, and gave full crops of fruit. The Early Richmond bore well last year, while the Black Morello bore nothing. I think the cold weather, with the previous overbearing, has utterly ruined our trees. Is it not a fact that our common Morello trees will live about so long and then die? In my experience that seems to be the case.

Mr. Minkler (of Oswego) gave it as his experience that our Morello cherry trees would, after a limited number of years, fail and die; and the true policy is to plant new orchards, and so provide for the decay and failure of the old.

Mr. McWhorter gave as his observation, that the Early Richmond was hardier and far more reliable than the Morello varieties. He remembered that in 1856 the Black Morello was much injured by the cold, while the wood of the Early Richmond was perfectly sound. His opinion was that the longevity of the trees was shortened by the hard winters, and not that they died of old age, as suggested.

Mr. Scofield (of Freeport) raised the question whether it was not a fact that trees worked upon the Morello stock fail because of that fact. He said that he had lost many trees on his grounds from this cause, as he believed. Trees grafted on the Mahaleh, he said, were still healthy and doing well. Trees grafted on the Black Morello stock soon show weakness. I attribute it, he said, to the effect of the cold winters.

Dr. Humphrey said that he had frequently taken the Black Morello sprouts and planted them, and afterwards budded them two or three feet from the ground; and they have done well, and proved healthy, and bore good crops after the third year. But there is another question to

which I wish to call attention, the Doctor continued, and that is in regard to the blight. He thought that he had discovered that the blight in our fruit trees was caused by the hot sun after wet weather. The past summer was a cold summer, and for this reason we have had little blight. He wanted to hear something upon this subject.

But the Society did not talk—I suppose upon the principle that "a burnt child dreads the fire." The orchardists of this State hesitate to put themselves on record, and explain again what they have explained so often, with such blundering success.

MR. MINKLER said that the report spoke of the rotting of apples; and he said he had never seen so little rot in apples as he had seen this fall. We grind up a great many apples in our neighborhood, and I repeat, I think I have never seen so little rot as there is, at this season of the year. I mean for the months of September and October. We have never ground up so many sound apples—apples so little afflicted with codling-moth's depredations. Mr. Minkler answered further, in regard to questions, "How to protect young trees from rabbits and mice." He used material that was always at hand, and that is blood. He had never seen anything better than to smear the young trees with blood, to protect from rabbits. Some recommended banking up the earth around the trees, to protect from the mice. Now, banking, said Mr. M., would be injurious, unless the soil was well packed down. It would furnish a harbor for the protection of the mice, and would be an invitation for them to come and work the damage we wish to avoid.

MR. MCWHORTER said he supposed that all that was meant by this word banking, was to throw around the tree sufficient dirt to make a clean surface, so that there may be no rubbish or litter in which mice hide. A clean surface is the best protection from the mice.

MR. HUMPHREY—I want to ask if really the depredations of rabbits are serious. I have never been troubled by rabbits. Will Mr. Hunt answer?

MR. HUNT (of Galesburg)—I think the depredations of mice are often attributed wrongly to rabbits. Injuries from rabbits, as compared with injuries from mice, are very limited with us. Of course, circumstances alter cases. In particular localities, where rabbits are plentiful, and there are plenty of young apple trees and a scarcity of other food, rabbits may become very destructive. But I have had very little trouble from rabbits, especially after my orchard became a few years old. I have great trouble, however, with the mice. I would not recom-

mend banking, unless it is done very late in the fall. Clean culture is the best remedy. Mulch or litter around the tree would be bad. He explained how destructive the mice were to him on trees that were healed in by laying them down and covering them up. Of 30,000 trees healed in this manner, some years ago, he saved but about 5,000. He has since learned to heal in trees by standing them upright and packing the dirt hard around the roots.

MR. WIER (of Lacon)—I have had a great many trees gnawed by the mice, and I soon found that it did not injure them at all! I have had trees gnawed all around, and I can testify that it did not injure them where the soil was immediately banked up around the trees and left there until the middle of the next September. There is no need of losing a tree from this cause.

MR. SCOFIELD—Would not the protection be better than the cure?

MR. WIER—No, I think not.

MR. SCOFIELD—I would like to know if there is any member of the State Horticultural Society that has had any trouble with mice, where his practice has been clean culture.

MR. ROBISON (of Tazewell) said fall plowing was the remedy. I have never seen any serious injury where the ground is cultivated. Now, in regard to Mr. Wier's suggestion. His cure would become a difficult one to perform when you consider that rabbits often gnaw up two feet high. The banking-up process would become troublesome—a thing almost impossible—certainly impractical. It strikes me that Mr. Scofield's statement, that the protection would be better than the cure, is strictly correct. It is my experience that the best protection is to tie corn stalks on the trees. I find that a man can tie up 400 trees in a day, at an expense of twenty cents for twine. I am mistaken if the protection is not better than the cure.

MR. CARPENTER recommended the use of tar paper. Extend it a little below the surface. This paper will last a lifetime.

MR. WIER said he thought friend Robison was wrong in his conclusions. He said his (Wier's) observations were upon 100 acres of an orchard, and he reaffirmed his faith in his former declarations, and reached the same conclusions. He said he was ready to prove his assertions, by taking a tree and stripping the bark from it, and then doctoring it in the way stated; and, said he, I will save it, and you will hardly know that it has ever received injury; and I will demonstrate that there is no need of losing a tree from this cause.

MR. HUNT, and others, still objected to Mr. Wier's theory; when Mr. Wier grew eloquent, and declared his readiness to show his faith by his works. I will take, he said, 400 trees, if any man will furnish them, and take off the bark all around for six inches up; and I will agree to plant and grow them all, without failure, or I will forfeit $1,000, which shall go into the treasury of the Illinois Horticultural Society.

MR. MINKLER (of Oswego)—I will furnish the trees. [Laughter.]

MR. HILL (of Galesburg)—I do not doubt that trees barked in this manner may be saved, if taken in time. But the injury is serious and should be prevented.

MR. MINKLER said that he remembered the winter of two years ago, when the rabbits were unusually plenty. He quoted Rob Douglass, of Waukegan, as saying, "He never saw anything like it." That winter the ordinary methods to prevent depredations were insufficient; and, after trying to trap them, and to destroy them in various ways, he finally offered so much a head for rabbits, and the boys with their guns effectually cleaned them out.

MR. WIER—If you want a remedy I will give you one; that is, give the rabbits something to eat that they like better than they do apple tree bark. My orchard is surrounded by brush. I go down into the branch, and cut down red oak brush and trees. The rabbits are very much more fond of red oak and sumach than they are of apple tree bark, and will take to this and leave the orchard. This, in my experience, is a sure prevention. I do not think I have ever lost a half dozen trees by the rabbits in a dozen years.

MR. MCWHORTER—Have you noticed whether they love the red oak better than the scarlet oak?

MR. WIER—What I call red oak you call scarlet oak.

TUESDAY AFTERNOON.

The meeting was called to order by the President at 2 o'clock.

THE PRESIDENT'S ADDRESS.

President HAMMOND addressed the Society as follows:

Fellow Members of the Illinois State Horticultural Society:

Time, with ceaseless flight, has brought us to-day to the twentieth anniversary of the organization of our Society, and we rejoice that we are privileged to grasp, in joyous greeting, the hand of those who welcomed the smiling infant when it first saw the light, who rocked the cradle of its childhood, rejoiced in the promise of its youth and the strength and vigor of its early manhood.

But, while we are proud of the progress we have made, and the position we have attained, we are reminded of other changes that have occurred since its formation. Where are the absent ones? Of those who assisted in its organization, and others who have taken an active part in its work, many have fallen by the way. We feel that it is cause for gratitude, that we have been permitted to enjoy the friendship of so many good and true men. We admired them for their skill as horticulturists, but still more loved and honored them for their integrity as men. And now that they have departed, we would cherish their memories and strew flowers upon their graves, fondly hoping that, after a few more storms shall have beaten upon our heads and a few more gleams of sunshine brightened our pathway, we shall meet them in that better land,

> "Of fairer valleys and streams than these,
> Where the river of God is full of water,
> And full of sap are His healing trees."

It is, however, more appropriate that the Society should pay its tribute of respect to these departed loved ones through its older members, who are to follow me. I shall, therefore, leave it in their hands, and now briefly address you upon the subject of home ornamentation, and attempt to show why every farmer, as well as every mechanic and laborer who owns a town lot, should be a practical fruit grower and ornamental horticulturist, and how this noble art may become a great national educator.

Perhaps the most alarming feature of the present age is the tendency of the most intelligent portion of our rural population to forsake the dull, routine life of the farm for the glitter and excitement of the city. And perhaps there is no one cause that contributes so much to this end, and creates such a spirit of unrest, as the uncomfortable and uncongenial homes of the great mass of agriculturists.

Ever since Adam and Eve were banished from the Garden, and looked back with vain regret to the loved and lost, man has instinctively loved trees and fruits and flowers, and all those beautiful creations with which the Almighty adorned his first estate; and as he has advanced in intelligence and culture he has striven to make his home approach in beauty to that of his great progenitor. And the home, however pretentious, that stands exposed to the cutting blasts of winter's storms and the scorching rays of summer's sun, without a tree to cast a grateful shade or evergreen to relieve the monotony of the dreary landscape, or fruitful orchard to form a pleasing background, with no vines clambering over the porch or trailing about the windows, or rose bush or flowers in the yard, is not the home that will satisfy the cultured man or woman of the present day. And we grieve to say that three-fourths of the rural homes of the land belong to this class—harsh, dreary and cheerless, with nothing to appeal to man's higher nature or minister to his æsthetic taste. To come as apostles of the ministry of horticulture, and teach to these benighted men a better way, is the mission of the Illinois State Horticultural Society.

It has often been remarked that one of our most striking national characteristics is a spirit of unrest. This is the controlling element that urges us on to "fell great forests" and transform vast prairies into seas of waving grain, with a rapidity unparalleled in the world's history; that has enabled us to build great, restless, throbbing cities, and people them with mighty multitudes; and has studded our land with thousands of pleasant towns and villages, within the memory of those present to-day. This same spirit has harnessed to the car of progress the forces of nature, and made them do its bidding; built great fleets of steamers, and long lines of railroads, upon which the chariots that Nahum in prophetic vision saw "jostle one against another, seem like torches and run like lightning."

This is the view of the picture of which we are proud, and upon which we love to gaze; but it has another side, and its contemplation is by no means satisfactory to the reflecting mind. This restless spirit, when carried into society and domestic life, makes man a discontented, feverish being, "seeking rest, but finding none"—ever ready to sell his home, and seek a new and more promising field of operation.

The nomadic character and uneasy spirit of our people has often been spoken of by European travelers. Says a French writer: "There is something surprising in this strange unrest of so many happy men, restless in the midst of abundance. The spectacle, however, is as old as the world; the novelty is to see a whole people furnish an exemplification of it."

How many of the farmers of Illinois, think you, my hearers, have homes worthy of the name, and to which they have become so attached that no reasonable pecuniary inducement would cause them to sell? Let us glance at a single neighborhood, which will fairly represent a thousand others. Here we find a pretentious mansion, which should be the home of a wealthy landowner. To save land—of which he owns five hundred

acres—it is built near the road, and the inclosure that surrounds it is used as a pasture. Save a few stunted fruit trees in a distant corner, not a tree or shrub is to be seen, and all the surroundings are as dreary and cheerless as a desert scene. That dingy-looking, dilapidated house is the residence of a young man, who ten years ago settled there, with few dollars in his pocket, but full of hope and faith in the future. But he committed the common error of bending all his energies to making money, and neglected to provide for his intellectual and æsthetic wants. The result can be imagined. By incessant physical toil he has become prematurely old, and broken in health and dwarfed in mind, with moral and religious faculties impaired. He sees too late his mistake. Had he labored less severely, and spent a few dollars and a little time in planting trees and flowers, his home would have been worthy of the name, his wife would not have lost the rose from her cheek and the sparkle from her eye, his children would have been more bright and intelligent, and his own mind unclouded.

On the next farm we find the house and surroundings in about the same condition; but the good wife, possessing an innate love of nature's beautiful things, has, with her own hands, in moments snatched from needed rest, planted and trained a few trees and flowers, thus relieving it from perfect desolation.

In such homes as these the children cannot have the advantage of good society or elevating associations. Education is considered of little importance; but work, work, is the all-important thing.

These are a fair representation of many of the rural homes in the State. It is, therefore, needless to pursue the disagreeable subject further; but rather let us glance at the opposite picture. Near by we see a humble, but tasteful cottage, painted a soft and neutral color. In the background may be seen the thrifty orchard, bearing its burden of choicest fruit. Immediately in the rear of the house is the carefully cultivated garden, yielding all manner of vegetables and small fruit. The barn and outbuildings are protected by belts and clumps of trees, the lawn is judiciously planted with evergreen and deciduous trees, and a modest flower garden sheds its fragrance upon the evening air; the wistaria, honeysuckle and rose clamber about the porch; and all presents a scene of wondrous sylvan beauty. Enter the house, and we find the same air of refinement pervading every apartment; books and papers upon the table, and pictures upon the wall. The carpets, curtains and furniture are all in taste, and correspond with the exterior. The children of such a home as this, being in the enjoyment of the many luxuries of life, good society and educational privileges, will have little desire for the glitter and excitement of the city, but willingly settle down to the enjoyment of a quiet, useful life.

Never in the world's history has there been such a necessity resting upon any people as presses the rural population of America to-day.

To them the nation looks with hope; from them must be recruited the decimated ranks of professional and business men; and may we not hope that from them may spring up a class of statesmen who will not betray the

most sacred trusts, barter their honor, virtue—nay, their very soul, for gold, and thus bring sorrow and anguish of heart upon us at home, and deep disgrace upon our nation abroad?

The demand of the age is for men—honest, earnest, cultured men. Men who regard not fear nor favor, who can neither be cajoled nor bought; but who, alike beneath the meridian glow of the sunshine of prosperity, or amid the howling storms of adversity, will stand for the right. Nowhere are they more imperatively needed, and nowhere can they be as well prepared for their life-work as in the department of rural life.

As in every village churchyard there lies

> "Hands that the rod of empire might have swayed,
> Or waked to ecstasy the living lyre,"

So there may be found in every rural community, guiding the plow or gathering the grain, pruning the orchard or training the vine, men of singular capacity, great capability and sterling honesty, who only need to be properly trained and brought to the front, to stir the nation with their noble deeds and burning words.

But the question arises, How can we train up such a class of men and fit them for the work that will be required of them?

"As the twig is bent the tree inclines." "The child is father of the man." The mother must lay the foundation, and upon it he will build. But we are told that the rural mothers of the present day are not equal to the task of training up a class of men who are to sway the destinies of the nation. Until the present decade this was true. Heretofore the farmer's wife has been a complete drudge. She has worked and waited and hoped, with unutterable longing, for that higher and nobler social and intellectual life for which she is so eminently fitted, but which it seemed impossible for her ever to reach. But the agricultural and horticultural press, and the various rural organizations sustained by the uprising of the rural classes, has opened to her the gate of hope, and lifted her above her little round of household duties, and shown her that for her own and her children's sake she must reach out and grasp that higher social life, and that her children must be taught a new doctrine—that science and art, that beauty and intelligence no longer belong to the cities alone, but are hereafter to be inseparably connected with rural life.

The future worker on the farm is to walk with open eyes among the golden grain, beneath the spreading tree, and to accept with joy and thanksgiving the treasures that Pomona and Flora lay at his feet. To teach the child to read aright these lessons of nature, and to guide it tenderly and lovingly in the right way, is the mission of the rural mothers of the land.

To the young men and maidens who are soon to take our places, we would also offer a word of advice. God, in His providence, has given you a "goodly heritage," and cast your lot in a favorable period in the world's history; and those who fit themselves for life's higher and more responsible duties will surely be called upon to perform them. The

lower walks of life are crowded with the surging, jostling mass; but there "is always room up higher." Prepare yourself by a joint education of the mind and heart for it, and there will always be a place waiting for you.

In the morning of life, "flushed with health and vigor," you look out hopefully upon the world. You see much that is desirable and worth striving for. "You hear afar the din of the conflict and eagerly long for the fray." But remember that the battle of life is a stern, long-continued conflict, and that courage and perseverance are the requisites of success. Enemies, numerous and determined, will oppose you. Ignorance, your most bitter foe, "stalks boldly through the land and must be enlightened." Public life must be reformed, or fearful dangers threaten. Private life needs purifying and elevating. The mighty hosts of avarice and ambition, represented by great combinations of wealth, will contest every step of your progress. And, to add to your dismay, you will discover the shores of life's treacherous stream strewn with the wrecks of those who have gone down upon the shoals of ignorance and vice.

There is a spirit of aceticism rife in the land, which is at war with all the refinements and beauties of life, and prides itself in looking with disdain upon the things which many of us consider so desirable, and which so positively minister to our higher and nobler nature.

We would say to these cold, unappreciative men (women intuitively love the beautiful and are never found in this class) as the young Quakeress said to her mother, when chided for loving the beautiful things of earth so well, "He made the flowers and the rainbow." And surely He would not have adorned them with such gorgeous colors had He not intended that we should love and enjoy them.

Says Downing: "It is not difficult to see how strongly horticulture contributes to the development of local attachments. In it lies the most powerful motive that civilized man has yet found to charm him to one spot of earth. It transforms what was only a tame meadow and a bleak landscape into an Eden of interest and delight. It makes all the difference between Araby the Blest and a pine barren. Do we need to say more to prove that it is the panacea that really settles mankind?"

Agricultural schools, the agricultural press and the various rural organizations have accomplished much in this direction, but to this Society is delegated the work of leading this movement, and bringing up to a higher plane and into a better social life the mighty host of stalwart tillers of the soil who crowd our noble Prairie State.

It may not be inappropriate to briefly consider the methods by which we hope to accomplish this desirable end. First, we must interest the young people of the country in the beautiful art of horticulture. Let the boys be made to understand that the "almighty dollar" is not the chief end of life, and that they are not expected to labor in the field six days in the week, from early dawn till night, with neither rest nor recreation; but encourage and assist them to plant fruit trees, vines, groves and belts of trees about the farm, and evergreens and shrubs in the yard or lawn. Devote a piece of ground to a fruit and flower garden, and encourage the

girls to make it their special care and to provide the table with all the fruits of the season; and while their city cousins are deciding the momentous question, what they shall wear at the next party, or poring over the last sensational novel, let them be wooing health and beauty in the orchard and garden, and assisting their mother in her various household duties, at the same time making themselves proficient in all the accomplishments a lady of the present day should possess; and they will be prepared, both physically and intellectually, for a life of usefulness, and to become the companions of the cultured men who are, in the good time coming, to be the leading spirits of the land.

A higher standard of education must also be sought for. Not only should agricultural and horticultural schools be multiplied, but our common schools should be made more attractive and efficient. More attractive, by making the house comfortable and pleasant, and surrounding it with trees and flowers. More efficient, by adding geology, entomology, meteorology and ornithology to the present course of study, and employing only teachers qualified for their work. And as a large portion of the pupils in our public schools will make rural pursuits their life business, it is but reasonable to ask that they be managed somewhat in their interest.

In conclusion, I would recommend that a special effort be made to interest the young people in the work of our Society. Our present membership is largely composed of men who have passed the meridian of life, and must soon pass off the stage. But we look in vain for the young men who are to take their places. How to accomplish this desirable end I will not now suggest.

I would further recommend that the Committee on Farmers' Horticulture be continued, and that prominence be given to the subject in our discussions. The farmers of the West need to be educated in both useful and ornamental horticulture, and if we can interest them in our work an important point will be gained.

In view of our present financial condition, and the fact that nothing can be done toward the publication of our transactions until we have assurance of aid from some quarter, it will be readily understood that it is of the utmost importance that an appropriation of, at least, $2,000 be made by the General Assembly this winter. And I would recommend that a committee be appointed at this meeting to devise and organize a plan to get the subject properly before that body, and press it upon their attention at the earliest possible day.

It has occurred to me that the interests of the Society would be subserved by hereafter paying the Treasurer a small per cent. on all moneys passing through his hands, and to require him to so keep a bank account that, in the event of his death, his successor could control the funds.

The sixteenth session of the American Pomological Society will be held at Baltimore next September. It is important that our State and Society be fully represented there. I would therefore recommend that such action be taken at this meeting as will secure a proper representation in that body.

That portion of our people interested in agricultural pursuits are becoming deeply impressed with the fact that this great interest should have a voice in the councils of the nation. The importance of this subject, and the necessity of immediate action, will be pressed upon Congress during this present session, and they will be asked to establish a Bureau of Agriculture, the head of which shall be a cabinet officer. I would therefore recommend that this Society petition Congress, and especially request the members from our own State, to give the subject the attention it deserves.

It was the intention of this Society to have made an exhibition of fruit at the Centennial that would have been creditable to the Society and an honor to the State; but our unfortunate financial condition rendered it impossible. It was therefore decided by the Board to accept the invitation of the State Board of Agriculture to unite with them, make up a collection at the State Fair, and forward to Philadelphia. Circulars were therefore sent out to horticultural societies and prominent fruit growers, requesting them to send specimens to the State Fair for that purpose. The result was a large and fine collection; but a combination of circumstances seemed to render it inexpedient to forward it. The horticultural interests of our State were therefore unrepresented.

Gentlemen, I will no longer detain you. You are fully conscious of the importance of the work in which you are engaged, and of the importance of faithfully pursuing it. Continue in the even tenor of your way, plant groves and belts, plant trees and flowers, and, although it may not be until you have been called from labor to reward, this Garden State, the noblest heritage God ever gave to man, shall become as beautiful as the garden of the Lord.

REPORT ON BERRY CULTURE.

Thomas Leslie, of Ipavia, read the following essay on Berry Culture:

Mr. President and Gentlemen of the State Horticultural Society:

I notice by the programme of this Society that I am one of the Committee on Berry Culture; I therefore take that as a hint for me to say something on the subject.

Our *Berry* crop in this vicinity, the past season, was above the average; but, in consequence of very wet weather the latter part of June, we could not place them on the market in good condition; and if it had not been for our home market—"*Ipava Canning House*"—I fear we would have met with heavy losses on Saturdays and Mondays. But, as it was, we received for our surplus berries from eight to ten cents per quart.

Our mode of picking and handling berries is as follows: Our pickers take a full case of boxes into the patch, picking directly into boxes and placing in case when full, thereby saving any extra handling; the foreman passing among the pickers to see that no inferior berries are put into boxes; as our experience is that poor berries never pay, and good, choice berries *always* pay a good profit.

Our commission men are best pleased with the octagon box of any we have yet tried. The Hallock or square box is good, but will not ship long distances quite as well, in consequence of fitting too close and not allowing proper ventilation.

HINTS ON SETTING.—I am partial to spring setting, in some respects; but if I was ready to set in the fall I should not wait until spring, but would sow oats on the ground, and by the time winter set in the plants would be well protected by a mulch that would not smother plants, nor have to be removed in the spring, but could be plowed under. After testing different systems, we finally have adopted the matted row system for strawberries, and the hedge row system for raspberries and blackberries. As most parties interested in berry culture are well acquainted with the modes referred to, it will be useless to enter into any description; but I will state that we invariably cover our beds with six inches of straw about the time it freezes up; in the spring we rake off the straw between the rows, and leave it there until after fruiting, for the following reasons, viz.: to keep down weeds, retain moisture, and keep the fruit clean. After the fruit was gathered, the past season, it turned off very dry and remained so until quite late in the fall; and, as a consequence, old plantations of strawberries made a feeble growth, and made but few young plants, so that we have a prospect of a light crop the coming season. Raspberries and blackberries did quite the reverse; they made a very strong growth, and bid fair for a heavy crop the coming season.

Of *Strawberries*, the varieties most highly esteemed by us are Charles Downing, Kentucky, Col. Cheney, Boyden's No. 30, Downer, Conqueror, Monarch, Green Prolific and Wilson's Albany. The above were selected from some sixty varieties that we have fruited.

Of *Raspberries* I have fruited sixteen varieties, and find the following profitable: Seneca, Mammoth Cluster, Davison's Thornless, Doolittle and Ganargua. Of red varieties, only Turner and Philadelphia.

Blackberries.—Snyder, Kittatinny and Wilson have given us paying crops. The inclosed letter from a friend is submitted to show what the Kittatinny can do under favorable circumstances; and I will vouch for the correctness of his statement, as I know he would not exaggerate.

Respectfully, THOS. H. LESLIE.

IPAVA, Ill., Dec. 9, 1876.

LEWISTON, Ill., October 21, 1876.

MR. LESLIE:

Dear Sir—I had, the last summer, a patch of Kittatinny blackberries of about eleven square rods of ground. There was picked from it seventeen bushels of berries. It looks like too large a story to tell, but that does not alter the fact. The soil is clay loam, and the ground is slightly rolling. They have had very little cultivation, and been allowed to cover the entire piece. The canes were all killed in the winter of 1864–5, and all cut and taken out of the way the next spring. The following fall a portion of them were cut out, leaving them in rows. They were partially protected with straw last winter, but that may not have been necessary, the weather not being very cold; still, I am inclined to think it was an advantage.

Yours truly, RUFUS PORTER.

BANCROFT'S REPORT.

L. Bancroft, of Pontiac, sent in a report on Berry Culture, which was read by the Secretary, as follows:

The past winter was mild and warm; at no time freezing ice the thickness of six inches but once during the winter. Small fruits and plants came out in the spring in fine condition, and promised well for a large crop of fruit; with strawberries and raspberries we were not disappointed.

The varieties of strawberries cultivated here are Wilson's, Downer's Prolific, Charles Downing and Green Prolific. The season of fruit time was favorable, and we had an excessive crop of large, fine berries. Downer's Prolific, on timber soil, is immensely productive; berry full medium to large, of good quality, fine color, and will produce at least one-third more berries than Wilson's. Charles Downing, productive enough for market, fruit of uniform large size through the season, color and quality good; will ship nearly as well as Wilson's, and sell for more money. Boyden's No. 30 and President Wilder are No. 1 in quality, show well in boxes or on the table, but with me are not productive enough for market. The Monarch of the West, with one year's trial, promises well; produces some monstrous berries, but not enough of them.

Raspberries.— The Doolittle and McCormick Blackcaps, Turner's Seedling and Philadelphia are the only varieties cultivated here; all of them made good returns. The season of fruiting was wet, which appeared to exactly suit the Turner's, and they really beat themselves.

Blackberries.—With the Blackberry we were sadly disappointed; it is not the first time; we are getting used to it. Lawton is worthless here. The Kittatinny is the only variety that has been grown here to any degree of success; it looked fine in the spring, bloomed full, but on black soil it failed to set fruit; on timber or clay soil it produced about one-third of a crop. A good number of the Snyder were planted last spring; none fruited yet; when they do, we expect to have blackberries the year round.

Currants, about one-third of a crop.

Gooseberries.—Houghton and American Seedlings were a failure.

We have one insect that troubles our vines; it is a small green worm: it makes it appearance on the raspberry the latter part of May, on the upper side of the leaf, which it riddles, eating all but the larger ribs, aud disappears about the middle of June. It has not, as I could discover, seriously damaged the berry.

L. BANCROFT.

THE STRAWBERRY.

Mr. Wier (of Lacon) spoke flatteringly of the extensive strawberry plantations of Mr. Leslie, of Ipava, and he gave a history of the visit of Mr. Galusha to that place, and what resulted from it. He was sorry that

Mr. G. was not present to tell his own story. But the point made by Mr. Wier was, that "this finest show of berries ever seen," and "these largest berries ever grown," particularly these "new varieties highly commended," are not going to stand the test. He stated that twenty-four hours after picking, these berries, when opened in Chicago, were found to be worthless, while the Wilson berries, shipped at the same time, opened up in good order. It begins to look as if the *Wilson* is the only strawberry that will bear shipping long distances. The Downing, the Green Prolific, the Boyden, the Agriculturist, the Kentucky, are splendid berries for home use and for near markets; but they are too soft to bear shipping long distances.

Mr. Leslie—The strawberries taken by Mr. Galusha were wet when they were picked, and we knew they would not keep in good condition long. I am also aware that the Wilson is a firmer berry, and will bear shipping better; but I cannot get half the money for them that I can for the Charles Downing, the Kentucky, the Monarch of the West and Boyden's 30. I shipped them to Chicago in June, and they sold well; and commission men complained that they could not get enough of them.

Mr. Hunt said their town (Galesburg) had received these berries from Mr. Leslie, and they came in good condition. Of course, for shipping long distances there is no berry that combines all the qualities of the Wilson; but we can't help feeling sorry for those who are brought to the necessity of keeping the Wilson. All who can get the Charles Downing, the Kentucky and Boyden's 30, will certainly give the Wilson the go-by. I can indorse all that Mr. Leslie has said for these new varieties, for home use and for near markets.

Mr. McWhorter (of Mercer county) inquired of Mr. Leslie how many years' experience he had had with the Charles Downing. To which he replied, *nine years*.

Mr. McWhorter—It is a fact that with the Wilson the beds need to be renewed every two or three years, to do well; how is it with the Downing?

Mr. Leslie—I have beds of the Downing that are seven years old and are still good.

Mr. McWhorter—In my experience no varieties do better than a *new* bed of Wilson's; and the secret of success with this variety is to plant new beds every two years, and you need never fail of success.

BLACKBERRIES.

D. B. WIER (Lacon)—There was a time when I thought blackberries should be cultivated and kept clean, but I have changed my mind; but I have had neglected patches do better than any cultivated ones. My plan for starting a plantation would be this: cultivate for two years, and then sow to clover. It might be well to cut out the weeds between the rows, but I do not know that even that would be of any benefit. As to varieties, I would advise to plant the Kittatinny and Snyder, if you can get them pure. The Kittatinny is the most profitable, and is the best, all things considered. The Snyder may stand the winters better. The season of the Kittatinny is long—say six weeks—and the crop does well in both wet and dry seasons; the berries do not dry up and get small; the last picking is as good as the first, which cannot be said of some other varieties. The Snyder, for example, will not last for more than two weeks, according to my experience.

MR. GASTON (of Normal)—Mr. Wier speaks of the shortness of the season of the Snyder. I commenced, the past season, to ship Snyder blackberries on the 15th of July, and we continued to ship for six weeks! I have the Kittatinny and the Snyder growing side by side—or I *did* have them so growing; I have now, from my experience, been led to dig up the Kittatinny and throw them away, and I have put in their place the Snyder. I now have nine acres of Snyder berries; I have picked, the past summer, 450 bushels of this blackberry, and sold them in Chicago for $1,600. I would differ with friend Wier in regard to non-cultivation; I would cultivate by shallow plowing. In the case of the Snyder, it is sure to overbear unless cut back; I therefore recommenced cutting back, otherwise the tendency to overbearing will make the berries average smaller than is desirable. But cut back and cultivate and you will have fine berries and satisfactory crops. It bears shipping to Chicago very well, although considered a soft berry. I have also shipped to Clinton, Iowa, and heard no complaint.

MR. SCOFIELD—Do you cultivate in hills or in hedge rows?

MR. GASTON—I cultivate in the hedge fashion. The thorns on the bushes are not so abundant as on other varieties. The laterals are not so long. I cut back and keep in a row two feet broad, and they give me satisfaction.

Voice—Give us a history of the Snyder.

MR. GASTON—This variety originated with a man, now living in Indiana, by the name of Henry Snyder. He found it growing wild,

transferred it to his garden, and sent out a few plants, until now it has become widely disseminated. A great many spurious plants have been sent out.

Mr. Vickroy (of Normal) gave his decided testimony in favor of the Snyder. He was growing it extensively.

Mr. Wier—Perhaps I have not managed the Snyder in the right way. It has not given me satisfaction, with my treatment. It may be that culture and cutting back may be what the Snyder needs. I did not so treat it. It will not do to cut back the Kittatinny after the canes are ripe, nor do you need to cultivate this variety.

Dr. Humphrey (of Galesburg) said that there was not another horticulturist in the country who could grow fruits without culture; and he thought that it would be wise for the State Horticultural Society to appoint a committee to visit the farm of our friend D. B. Wier, at Lacon, and see and report to the world how he did it. [Laughter.]

Mr. Robison (of Tazewell county) said that the "*rust*" was the great drawback with him in growing the blackberry. He found all varieties were alike affected. He had to abandon his plantation, and is now planting anew.

Mr. Gaston—I have watched for the *rust*, and expected it to attack the Snyder, but I have not yet seen it in my plantation. I do not know that the Snyder is exempt. There may come a time when this variety, too, will rust.

Mr. Leslie said he mulched his blackberry plantation and trimmed back with a corn knife; this was one method of cultivation that answered well.

Mr. Tull (of Hancock county) said that he had found the Snyder hardy and an abundant bearer; but the "biggest thing" he ever saw in the shape of a blackberry was a wild variety he found in the woods—a little patch two rods square—ripe before the Snyder or Kittatinny, ripe and fallen upon the ground, many of them, before he found them; "I believe in my soul," he said, "I could have picked and sold from that two rods of ground $100 worth of berries, if I had seen it in time;" and when he said, "I will send any friend a few plants for trial, if they will pay the expense of postage," there was manifest satisfaction and *purpose* in the faces of persons present.

Mr. Wier—I have no doubt there are plenty of good, hardy varieties of blackberries in our woods that would be very valuable. I have gathered

at least twenty varieties myself for trial, and some of them are quite as satisfactory as those in cultivation; and it is by this method of trial and selection that we are to obtain improved varieties.

In relation to *rust*, Mr. Wier said that some twelve years ago he watched it closely. It seemed to come and go, no man knew how nor when. Dr. Hull used to say that when the rust got into a plantation it could not be got out, but would ruin the patch, sooner or later. Two years ago the rust broke out in my blackberry patch and covered a space as large as this room. This spring I looked for it, and nothing of the rust could be found. The fruit ripened perfectly, and, so far as I can see, the canes are in good condition.

Mr. Hunt—I would like to ask Mr. Wier if he thought the Kittatinny more subject to rust than other varieties. I have the Lawton on my grounds, and they are not affected with rust. Last spring I planted Kittatinny and Snyder. If the Kittatinny is more liable to rust than other varieties I would like to know it. Should I dig up the rusted plants as they appear?

Mr. Wier—The Kittatinny does *rust*, and is quite subject to this disease. The pulling up of the rusted plants does no more good than the locking of the stable after the horse is stolen.

Mr. Leslie—My practice has been to dig up the plants affected with rust as fast as they appear, and I have not been seriously troubled with it, and not so much now as at first.

Mr. Carpenter said there was philosophy in the practice of removing the diseased plants. We take a *sick* man from among well men, and so prevent contagion, and so we must do with the blackberry rust, if we would check it.

Mr. Hunt—If the doctrine of Mr. Wier is correct, we have little encouragement or hope of conquering this disease. I think thorough *cremation* will prevent the contagion. If this will not save us, what can?

Mr. Wier—Nothing! nothing!

DISCUSSION ON THE CHERRY.

Mr. McWhorter—I want to ask Mr. Kinney if he has ever seen any difference in the longevity of the Early Richmond, when worked on the Morello rather than on the Mahaleb?

Mr. Kinney—I think I have. I know an orchard which, ten years ago, was grafted on the Mahaleb, and to-day scarcely one of these trees

is living; while another orchard, grafted on the Morello, is in good, healthy condition, and bears well. I like the Mazzard stock, if the roots are planted deep, out of the way of severe frosts.

Dr. Humphrey thought budding the cherry was preferable to grafting.

Mr. McWhorter had never found any one who had made a complete success in grafting; the cherry-budding is best.

Mr. Dennis advised growing the Early Richmond cherry on its own roots; he found that the trees lived longer and bore better crops. It certainly seemed like the true way to grow the Early Richmond. It had been, in his experience, a marked success.

President Hammond said that there was now a great many of these trees in the country. In Hancock county they are generally distributed. Some twenty-five or thirty years ago the branches of the Early Richmond were layered, and from this sprang the trees on their own roots. The tree is longer lived, bears more certainly and more abundantly than other trees, and is every way better.

Mr. Wier, whose experience is often very remarkable and diverse from those of his brethren, said that the Early Richmond, on its own roots, is just as long lived and just as good as any other, but no better. In regard to the Morello and Mahaleb stocks, he said: My experience has been just the reverse of Mr. Kinney's. I have cherry trees grafted on the Mahaleb that are twenty-five years old, and they are still sound trees, while those grafted on the Morello were gone long ago. Besides, we do not want cherry trees that throw up sprouts, like the Morello does. Again, about this matter of budding and grafting, as to preference there is no difference; one is good, and so is the other. There is one objection to grafting on the Mahaleb, it is not *hardy;* but graft under the ground and you will have the same thing as a tree on its own roots.

Mr. Kinney—I have no trees more than fifteen years old; those on the Mahaleb were the first to die; I do not know that it is from the cold. They seem to die all the same, whether the winters are "hard or soft;" die from some unknown cause.

Voice—What is your subsoil?

Mr. Kinney—It is a stiff clay, three or four feet deep.

Mr. Wier—Would you call it a rich soil?

Mr. Kinney—You would call it a *good* soil. I call that a good soil that will grow a good crop of corn.

Dr. Humphrey—I think that fifteen years is about the age of the cherry on the Mahaleb stock, but they bear early, and are, therefore, profitable, if they are short lived. We can afford to give them up and plant again.

Mr. Bryant—In my neighborhood nobody will buy cherry trees worked on the Mahaleb, if they know it.

Mr. Robison—I know of cherry trees in my county that were brought from England thirty-seven years ago; these trees are still standing; they are the Early May variety. It is my opinion that trees on their own roots do best; they are two or three years later in coming into bearing, but stay when they do come.

Mr. Barnes—I planted, ten years ago, a cherry orchard on the prairie soil. The trees worked on the Morello stock have borne me three large crops; those on the Mahaleb have not borne a cherry! I am glad to learn that the Early Richmond does well upon its own roots, for on our soil the Mahaleb will not do well.

Mr. Edwards (of Sandwich)—I have grown cherries in this State for thirty-one years; have trees twenty-five years old on the Mahaleb, Mazzard and the Morello, and I know no difference. The average age of the trees is about twenty years. Those on the Morello bore first, but those on the Mahaleb bore larger fruit—about double the size; and the same is true of the Mazzard.

RASPBERRIES.

Mr. Kinney—The Philadelphia is hardy and most productive with me. The Turner is the next best. The Turner suckers so immensely that you have to cut them down as weeds.

Mr. Scofield (of Freeport) said the Philadelphia stood the winter well with him.

Voice—The Philadelphia is enormously productive; so much so that I could not get help enough to pick them. I never saw anything like it. I have not succeeded so well with the Turner; it is a fine berry.

Dr. Humphrey said he succeeded better with the Blackcaps than with any other sort.

SPECIAL COMMITTEES.

The following committees were announced by the President:

President's Address—T. McWhorter, B. F. Arnold, C. N. Dennis.

Fruits on Exhibition—D. B. Wier, John R. Tull, D. F. Kinney.

Final Resolutions—H. K. Vickroy, William Nourse, Prof. A. H. Worthen.

REPORT ON GENERAL HORTICULTURE—SECOND DISTRICT.

D. F. KINNEY, of Rock Island, read the following report for the Second District:

The winter of 1875–76 was much milder than the one that preceded it. There was more rain in the autumn of 1875 than any autumn for three years previous. Fruit trees that were healthy came through the winter in excellent condition, but many trees had been injured by the severity of the winter of 1874–75, and these have been dying, more or less, ever since. Last spring was very wet, and trees got an excellent start and made a good growth through the season, notwithstanding the month of July and August were hot and dry.

The *Apple* crop was probably the largest ever grown in the State. The bloom did not appear to be excessive, but every one seemed to produce an apple. Much of the fruit was very inferior, caused, no doubt, by the immensity of the crop. Nearly all kinds have dropped their fruit earlier than usual, and some varieties of early winter apples are rotting badly. A large amount of cider and vinegar has been made, and some apples have been left to rot on the ground. The Codlin-moth was quite numerous and Canker-worms in two orchards, but were not as destructive as in previous seasons.

There was a fair, medium crop of *Pears*, of excellent quality. The winter of 1874–75 destroyed a great many pear trees, more especially dwarfs; of my own nearly all were killed, except some old ones that were standing in grass.

Blight has been more troublesome than usual the past season. I have not lost any large bearing trees, but some young trees have died from that cause.

From my past experience I am satisfied that it is better not to cultivate much after the tree has been planted three years, and after five years I would leave the ground in grass, but would cut the grass at least twice in a season and place it around the roots of the tree.

Of *Cherries* there was an average crop. Early Richmond is the kind mostly planted, although English Morello and May Duke are used to some extent; they are worked on Morello, Mazzard and Mahaleb stocks.

There are but few *Plum* trees planted in this vicinity, and it is quite rare to see plums in market.

Peaches are not grown to any extent, still we see trees occasionally bearing good crops; but few trees are planted, as people have but little faith in them.

There was an average amount of *Grapes* grown the past season, but few were well ripened; the weather was too cool and wet. The winter of 1874–75 injured the roots of grape vines, and consequently the fruit was not as large and well developed as in former years. There are probably forty acres of land planted to grapes in this county, and probably nineteen-twentieths are Concords; it is the only variety that is really worth planting in large quantities. But little wine is made. The fruit

is mostly eaten raw, canned, and made into jelly. There is not much inducement to plant when the price for grapes is two and one-half cents per pound, as they were sold in market for that price the past season.

Three or four seasons last past have been disastrous to *Strawberries*, on account of drouth and the ravages of the white grub. The past season the vines have grown finely, and are in good condition for a crop of fruit next season. The usual manner of growing them is the matted system, and when the vines do not grow enough to cover the ground *grass and weeds do the matting.*

Raspberries have done well, and are more planted than any other small fruit. Black are more planted than red in this vicinity; of my own I have as many red as black, and find them fully as profitable.

Currants were a tolerably fair crop, but are not usually cultivated well enough to make them profitable.

Gooseberries, good crop, but not very profitable.

Blackberries have not been planted much. Some have tried them, but they have been frequently killed by the cold, and have not been productive enough to encourage people to plant them.

TUESDAY EVENING.

The hall was well filled in the evening to listen to the reading of the two essays which appear below.

Immediately on coming together the names of H. B. Elwanger and W. C. Barry, of Rochester, N. Y., were presented as visiting delegates from the Western New York Horticultural Society, and they were, by a unanimous vote of the Society, elected Honorary Members of the Illinois State Horticultural Society.

These gentlemen responded in a becoming and appreciative manner, and invited this Association to send delegates to their Annual Meeting, to be held in January, and the Society appointed the Hon. W. C. Flagg, of Moro, as a delegate to that meeting.

THE PROGRAMME

For the evening was to have been reports on Entomology, by Prof. Cyrus Thomas, of Carbondale, our State Entomologist, and Prof. C. V. Riley, of St. Louis, State Entomologist for Missouri, and by others; but these gentlemen being absent a new order of exercises was extemporized.

O. L. Barler, of Hinsdale, Illinois, was requested to occupy a half hour, which he did by reading the following essay on the subject—

THE MINISTRY OF WORK.

Work has a mission as real and as legitimate as worship. There is a sense in which work is worship. The preaching that inspires only to prayer and praise and emotional experiences is not just the thing, after all. If these experiences and acts lead not to larger activities and industries, then is "our preaching vain; your faith is vain, and ye are yet in your sins." I cannot doubt that work is a real means of grace. The avocations of this daily life, and by which we obtain a livelihood, are helps in the golden track that leads to God. Yes, work has a meaning; work has a mission. One must think so, who looks out upon the busy on-going of this world. See, in the great marts of trade, what bustle; what din; what uproar; what multitudes, surging and dashing like waves of ocean. Men rush and run, and spend their energies, in this direction and in that direction. If you did not know to the contrary, you would think surely there was a fire somewhere in the city, to which the jostling multitude was hastening to extinguish it. A stranger, dropping down from the moon, would betray a most quizzical face as he inquired: "What does all this mean? What's the disturbance? What has possession of the people?" The calm and sure reply would be: "The people are at their work. Only this, and nothing more."

This is a world of work. The scene of to-day was that of yesterday; will be that of to-morrow and next day. It has been the same through all the prosperous centuries, and will be the same till the final consummation.

I am impressed with the thought that the multitude are already overworked. It is not in my heart to add a feather to their burden. Rather would I lift the weight of care. I know how chafed these men are. The father comes home at night from his daily toiling; he is not altogether himself; he is morose and petulant. We will forgive him, for the labors of the day have fretted him. Jaded in brain or muscle, or in both, with little vital force left in him, he is unable to maintain good behavior. His own children are so shy of him that they fear to come near him. The dogs dare not bark in his presence, and even puss is safe only in a distant corner. Wife understands the situation perfectly, and asks no questions, but hastens to get the supper ready, and feels relieved when "the lord of the manor" is put to bed and sleeping. The poor man works, in his way, too hard. When the day is done he has not life left to speak pleasantly; no, nor strength to murmur his nightly prayers. Shall I preach works to this man? God forbid that I should tax him in directions in which he is already oppressed. I would emancipate him from the slavery of his calling, and proclaim the true gospel of work.

It is the business of the child-man to play away the first years of life. It is natural and right for children to play. The bird is no more fitted for flying, or the fish for swimming, than the child for playing. It was

meant that he should be pleased with his mother talking nonsense to him. It is expected that he will pull the plates from the table and smash his toys. Their romp and noise may, and do, drive "weak-headed mothers crazy." Yes, and it "aggravates the aggregate of the shoe bill." Oh, and it makes terrific work with trowsers! But, mark you, how surely it makes men! Would you crush the child's spirit, or check him in his play? What! resist God's ordinance? Better my tongue cleave to the roof of my mouth; better my right hand forget its cunning. I'll do no such thing! Play for him is legitimate. The boy may have no purpose in his pranks and play beyond present pleasure—but God has. The divine purpose is definite and far-reaching. God means certain development of a healthy and rounded organism; and that means, in the near future, efficient working men and women.

But if the child-man should continue to play on through youth to manhood, he would surely drift into dissipation, thence into vice, and so on into crime. The time comes, in the life of every individual reaching manhood or womanhood, when earnest, honest work must be admitted as a ministry of life. An idler, I was going to say, was not thought of in God's plan. No provision was made for that class of men. They are tramps and vagrants, and it was an after thought to spread a table for them in the calaboose.

On the other hand, a man that works and fodders like an animal develops like an animal. And if our whole life is to be consumed utterly in physical effort, what better are we than oxen, made to bear burdens? Nay, in the comparison man appears to disadvantage.

"Go thou, mock majesty," and bow to thy "superior of the stall." They come into being, reach the perfection of fat cattle, are satisfied, and die! Not so "reason's precious dower." Man lives in great imperfection here. He is filled with yearnings and discontents; his hopes and aspirations fail him; confusion covers his face; he dies and goes to nothing—if so be there is no greater good than to sweat, and serve, and gather into barns. Labor, considered as an end in itself, has no dignity. Labor, without its compensation in somewhat beyond itself, is a *curse.* I have not a word to say against labor in its office. Who works, and I do not? And yet, work is not *the all* of life; work is not the *sublimest thing* in life. It is sad to know that there are multitudes who have nothing better in life than what they get out of it through hard, exhaustive toiling. Is gold the principal thing? If you were starving in a desert place, could mountains of gold serve you? You could not eat gold. You could not sleep on nuggets of gold. Gold is worthless, except for what it can purchase; and so work, its synonym, has worth and dignity only for its ministry. If it makes no worthy achievements, then it is nothing—worse than nothing, for then it has in it the elements of a curse. "In the sweat of thy brow shalt thou eat bread." There is a deal of work without suitable reward, either in this world or in the world to come. Work "intransitive," work without an object, is "a monster, illegitimate in its origin and unjustifiable in its existence." Work must bow to the ministries of life; this is its office. Work was made for man, and not man for work.

The moment work becomes master we are no longer freemen, but slaves to a calling. Being such, the man develops monstrously in *one direction*, but is dwarfed in other directions. They make not whole men, but fractional men, and die at last; and often for lack of worthy deeds following, receive burial "too profound for resurrection."

The impression prevails that the working class, in the trades and in agricultural pursuits, must need lead very simple lives. Little knowledge will serve them, it is thought. The story of the youngster who emigrated West illustrates. He wrote back to the "old man," as he called his father, persuading him to follow, saying, "Mighty small men get office out here."

The further impression has gone forth that young men who have not brains enough to make lawyers, nor piety enough to make preachers, will yet make very good farmers. The fact is, every department of labor is calling for men, and the greater their attainments, the greater will be their achievements; and the greater their achievements, the greater the possibility of further achieving, till, at last, the master-workman dies, "capable of a greater deed than he has ever yet performed." And so work comes to mean achievement and good will to men.

In its reflex influence work is discipline. It has training power, and helps, almost omnipotently, in the production of true Christian manhood.

There is, in the untamed and untutored young life, abundant resources. These will surely be expended in some direction. If not in the regal services of work and duty, yet in some service. It is important to control the impulses of young life in healthful and useful directions—and that is the *mission of work*. So that the reward of work is not only a livelihood, but a *manhood*.

All recognize the necessity of labor. If there was no *necessity* men would not work. "Who lays stone fence for the fun of it?" Men are continually *shying* work. There is special aversion to physical effort. What means this overcrowding of the professions, when the demand for productive labor is not supplied? Why are our cities overrun with applicants for clerkships and office work, when the farm and workshop call in vain, "Come over and help us?" What means this "quadrennial tramp to Washington?" I have heard it said that "something less than one hundred thousand able-bodied men make a pilgrimage to the national capital every four years." What do they want? You know what they want. They want "statesmanship!" a "collectorship!" a "post-officeship!" any sort of a ship that will float them, and save them from the necessity of manual labor. The periodic panics that afflict our country have the same meaning. They mean that somebody is trying to live without producing anything. It has been pretty correctly estimated that the whole productive wealth of the country, if divided by the amount of population, would not exceed thirty-one cents each. Now, this is a significant figure. What does it mean? It means there are more Rip Van Winkles than one. It means there are more men who are "averse to all kinds of profitable labor" than is good for the country. And yet, on the

other hand, work is not life; no, nor its *equal.* No work, however great, but sinks in comparison with the workman. *He* is above his work. The workman is greater than his greatest work. Man's noblest productions are unworthy of him, and shadow but "hints of his power."

Work has its place in the economy of life as a ministry. It is in its discipline and achievements that work throws off all its repulsive features and assumes "the form and functions" of an angel of light. Yes, the workman may rest from his labors, but his works follow on.

We marvel when a good man dies. Why is this? We ask, in despairing tones, "who now will stand in his place?" forgetting that influence and work never enter the tomb. Good deeds live even more efficaciously now than when the actors walked the earth. I read in the papers of a devoted mother who reared a large family of six sons. They all became eminent for their Christian virtues and marked ability, and all are now filling offices of great trust. One is an eminent jurist, one is a congressman, one is a noted preacher, one is a general in the army, one is a United States ambassador to a foreign power, and one is the honored president of a college.

That mother died years ago, but her influence and work live in these noble sons. Can they ever forget her? Do not her teachings hang in their memories like "clouds in the sky?" Can they ever forget her loving patience, her gentleness, her self-sacrifice? Never. You throw a pebble in the ocean and a wave is started, that goes on widening and extending to the thither shore. The invisible influence that attends noble working can never die, and the results can never be told in this world. Every beneficent act, every benevolent enterprise, every Christian institution in the land, once lived only as a thought in some one mind. The outcome is the widening influence of that man's noble thinking, and the end is not yet.

No workman, in all the ages past, ever manfully wrought a good work but lives. Bunyon lives in his "Pilgrim's Progress;" Milton lives in his "Paradise Lost;" Jesus Christ lives in the Evangelical Histories, and in the life of believers. Grand results come of noble working.

I may be permitted to abbreviate and paraphrase the eloquent words of another, and say: Before work, like a dissolving scene, the forest fades away, with its wild beasts and its wild men. At the bidding of work, smiling villages spring up among the hills, great cities are buildt on the plain, and fields of golden harvest spread everywhere. Work explores the secrets of the universe; it counts the ribs of the mountains; it feels the pulses of the sea; it traces the footpaths of the stars.

Work! It assembles the animals of the forests, the birds of the air, the fishes of the waters, and calls them all by name.

Work! It summons horses of fire and chariots of fire and makes them the bearers of its thought.

Work! It plunders the tombs of dead nationalities, and weaves living histories from the shreds it finds. Work seeks out and sets in order the secrets of the soil, and divides to every plant its food. Work builds and binds into unity great philosophies, along which runs the thought

and the life of ages. Work embalms the life of nations in literatures, in whose crypts are scattered seeds of thought that only need the light to spread into harvests of bread for living generations. This is work, and this is its mission.

To thus work is to come into fellowship with all the great and the good, the world over. A life of earnest, honest work brings us near to God. For God works; Jesus Christ works; the redeemed man works.

Blessings on and blessed be the workman.

REPORT OF COMMITTEE ON ORNITHOLOGY.

Prof. S. A. Forbes, of Normal University, read the following paper, which attracted special attention, as indicating the commencement of very important and much-needed work:

THE FOOD OF BIRDS.

BY PROF. S. A. FORBES, OF NORMAL UNIVERSITY.

It has become a truism of these times that Nature is the most helpful of all allies. If a modern man has before him any difficult undertaking, he tries, first of all, to discern what forces of Nature already tend in the direction of his purpose, and then what others can be diverted to his service. He fights by direction, by generalship, and never levels his own weapons until he has exhausted every art at enlisting other combatants against his enemies. The first savage who armed his naked hand with a stick or a stone, or interposed a shield against the blow of his adversary, ignorantly followed this principle, and railroads and telegraphic cables are to be reckoned among its higher applications. There is no wonder, therefore, that horticulturists should have asked, long ago, "How does Nature fight the bugs?" But we are not yet wholly awake to the significance of the answers.

The principal natural checks upon insect life — apart from those changes of season and other general influences to which all animals are subject—are birds, audacious insects and parasites. There is no occasion to question which of these is the most potent, and I believe that most persons will agree with me that birds are a hundred times more destructive of insects than other insects are, because birds eat beneficial insects as well as injurious ones; and if we follow the advice of our entomologists, and import birds and encourage parasitic and predacious species, it is evident that we must make a careful study of the food of our birds, in order to assure ourselves that our insect friends will not be devoured as fast as they can be multiplied.

It seems to me evident, therefore, that an intelligent and scientific horticulture will include a careful study of the relations of the birds to the labors of the orchard and the garden; will devise measures to encourage the beneficial species, to exterminate the injurious, and to substitute, in as many cases as possible, the more valuable for the less valuable kinds.

That we are not yet prepared for intelligent action of this kind, is evident to all. That we should encourage the breeding of *some* birds, I think all are ready to admit. That there are some others which it would be to our advantage to destroy, is very commonly believed. But as soon as we ask, "*what* species will you preserve and what destroy, and how complete a basis in fact has your preference or your condemnation?" we encounter, at once, a radical conflict of views and a mass of conjecture, careless observations, crude and inconclusive reasoning, and much prejudice, and much more guess work. Even in the East, where this question has been prominent much longer than here, little is known that is accurate and exhaustive about the food of any except the commonest species, and the assertions made often rest upon data which no scientific man would accept as sufficient. And even if the subject had been worked out elsewhere with all possible skill and completeness, it would be necessary to know to what extent the food of a species varied with its locality, climate, etc., before we could adopt such conclusions for our own guidance. In fact, we should, even in that event, need to make a careful, original study for our own State. The magnitude and difficulty of the subject will be more apparent when I have made a more explicit statement of the condition of the problem.

We need to know the food of the commonest birds, at all seasons of the year and in the most varied surroundings. A bird which may do conspicuous injury at some seasons, may quietly and unsuspectedly do a far greater good at others. One which in prairies, not finding there its favorite food in abundance, may be reduced to feed on the products of the garden, may be in other situations either entirely harmless, or so beneficial as to make its wholesale slaughter a public injury. The food of birds may further differ, materially, with different years, for all that we at present know to the contrary.

We must also know the food of each species at different ages of the individual, especially of birds while yet in the nest, as well as of adults. Many of the seed-eaters, for example, feed their young almost entirely upon insects; and it is evident that facts of this kind are of great importance for our purpose.

But the food of nearly every kind of bird, having any direct relation to our subject, is *mixed*, partly injurious and partly beneficial. Even the bluebird feeds upon predaceous beetles as well as the injurious ones, and takes an occasional hymenopter also. We shall find it necessary, therefore, to learn the proportions in which the different elements of the bird's food enter into the total amount. We must attempt quantitative as well as qualitative investigation. In short, we must open an account current with every common species, at least, and from time to time strike a balance, until we are sure that we have the items for a fair average of its services and their cost. Then, and not until then, we shall be ready to act intelligently. Without such knowledge our conclusions will be too much like the verdict of a sleepy jury, which should catch only here and there a sentence of the evidence. Further, to exhaust the possibilities of important discovery, it would be necessary to study the food-habits of the

less familiar kinds. It is not at all unlikely that among the little-known denizens of the forest and field an actual knowledge would show us many that we should do well to encourage by special protection, perhaps even by artificial breeding. At any rate, every ornithologist knows that some of our most useful kinds seek the protection and abundance of man's neighborhood; and, as these were, of course, originally wild and self-dependent, it is not unreasonable to suppose that others may be brought to this state of semi-domestication, if this is proved desirable. Besides, until we know the manner and extent to which the different species compete with each other for food at scant seasons, we cannot tell how best to favor the increase of those which we find beneficial.

We must also take account of the fruits and grains in bearing at each season of the given year, in order that we may arrive at a knowledge of the *preferences* of birds. It is possible that a bird may feed largely upon insects in the early spring, and yet eat only fruits when these are ripe. We must know the kinds of food in considerable detail. If this is vegetable, we must discriminate the kind of seed or other vegetable matter, at least so far as to tell whether the bird is directly injurious or not; and if it is, we must know the kind of fruit or grain upon which it feeds.

If the bird is insectivorous, we must know at least the order of the insect, and must be, in most cases, able to say further that the insects represented are or are not of certain beneficial families or genera. If possible to make out the exact species, this adds certainty and completeness to the information, and makes it of special scientific value. If the bird, like a hawk or an owl, feeds upon other birds or upon mammals, we must know the kinds of these, in order to tell whether they are destructive or not; and, in general, the more accurate and detailed is our knowledge, the more reliable will be our results.

But all this, it may be said, involves a long and tedious research, which it will take time and money and talent and learning to accomplish; to which I reply, that these are just what valuable knowledge generally cost. Whether in this case the probable results are worth the effort, you are best qualified to judge.

Of course, so exhaustive an investigation as this is not necessary to the *beginning* of accurate and valuable knowledge. We may begin to gather the fruits of our labors from the first by a nearer *approach* to the truth; but nothing less than this will clear the whole field of doubt and error.

Three methods of observation have been employed in this matter. The birds have been watched while taking their food; they have been fed in confinement, and the contents of their stomachs have been examined after death. The second method evidently shows only what the bird *will* eat in confinement of such food as is placed before ~~him~~, and furnishes no data which we can use with any security in making up an account of ~~his~~ food in freedom, when ~~he~~ has to search for ~~himself~~. The first shows us what the bird probably or possibly eats at the particular time, and under the particular circumstances when noted. It lacks cer-

tainty and continuity. Serious mistakes are easy, and indeed unavoidable, and a distorted notion of the food of the bird will necessarily arise in most cases, since it will be seen so much more frequently in some situations than in others. The contents of the stomach, however, furnish a record of the food usually during several hours' wandering—a kind of an old bill of fare—often difficult to decipher, with occasionally a name obliterated, and yet, on the whole, comprising material for a very complete diary. Of these three methods, the last is undoubtedly much to be preferred. A combination of the three, if the results are treated judiciously, would probably be more trustworthy than either alone.

I have depended, during the past summer, entirely upon the examination of stomachs. The stomach and crop—if it had one—of every bird shot at the Museum during the spring and summer, were put immediately into fresh alcohol when the bird was skinned, with a number attached, referring to a list. This list gave the name of the species, the date when shot, the locality and the exact situation, whether field, marsh, orchard, garden, etc. About 350 stomachs were thus obtained from Normal and its vicinity. Arrangements were further made with Messrs. E. W. Nelson, of Chicago, and Fred. T. Jenckes, of Providence—two ornithologists, who proposed to spend the collecting season in the field in Northern Illinois—to prepare, in a similar manner, the stomachs of all the birds shot by them. Consequently, at the end of the season, I found that I had over 1,000 stomachs on hand, in excellent condition, representing the birds of McLean and Cook counties during the spring and early summer, and the former during the latter part of the summer and early autumn also.

At this point, I might perhaps have properly concluded that the labors of the ornithologist were finished for the year, and that the matter should now be turned over to the specialists in botany and entomology; but I was unwilling to come before you without some contribution to a knowledge of the subject in which you are especially interested; and I have therefore examined, more or less thoroughly, the contents of 220 of these stomachs, and have brought the results together in the form of a table, constructed to show, in as small a space as possible, the facts already alluded to as the essential ones for our purpose. The contents of these stomachs have all been placed in separate vials, and these vials numbered to correspond to the list mentioned above, so that my conclusions can be at any time tested by reference to the original data. I need not say that I have not exhausted the subject. Probably there is not a specimen here that could not be made to yield from five to ten times as many facts as I have so far got out of it. I have made no more than a preliminary examination, and the results given must be regarded as subject to revision, and capable of much greater elaboration. Lack of time, and the fragmentary nature of the material, ground sometimes to a powder of microscopic fineness, together with the difficulty of the subject, have forced me to content myself, at least for the present, with few specific names. But in most cases I have been able to bring the identification within limits sufficiently narrow for our purpose.

The principal difficulty of the investigation appeared when I began to estimate the amount of injury or benefit indicated by the contents of the stomach of each bird. Before I could tell how much credit to give to a bird for eating beetles indiscriminately, I must know what ratio the injurious beetles held to the beneficial and the neutral; and when I found the food composed of a dozen different elements—caterpillars, beetles, hymenoptera, blackberry seeds, etc.—I must settle in my own mind what relative importance to give to each of these elements.

Of course, all this must be a matter of individual knowledge and judgment. The problem is not one which can ever be settled with entire accuracy. All we can expect is, that our conclusions shall approximate the truth more and more closely as observations are multiplied. Investigations of this kind are well illustrated by the prognostications of the Weather Bureau. If observations are carefully made and correctly tabulated, predictions based upon them increase in certainty with the number of the data.

In making up my estimates of the horticultural value of the different species of birds, I based my calculations upon the following guiding principles, to which I ask your attention, because the value of the estimates depends very largely upon the correctness of these principles:

1. Any bird of which it is only known that it feeds upon insects, is to be regarded as beneficial, until facts are discovered to the contrary. I have heard it argued that a bird feeding indiscriminately upon insects of all kinds might do more harm by destroying insectivorous and parasitic forms, than good by devouring the injurious ones. A moment's reflection will show the unreasonableness of this view. The extermination of all insects, of every species, would doubtless be a benefit to horticulture, although by no means unmixed with evil. The destruction of half the individuals of each species would therefore be proportionably beneficial, and the same must be said of a hundredth, a thousandth or a millionth part—or, in short, of any proportion of them eaten by birds having no preferences. As the beneficial insects are, as a rule, either smaller or more active (or both) than their victims, they will be, in fact, less liable to capture by birds than the latter.

2. A bird feeding upon hymenoptera is to that extent probably injurious. If the hymenoptera found are neither Tenthudinidæ nor Neveridæ, this probability is greatly strengthened. If they are known to be Ichneumonidæ, it becomes a certainty. A bird feeding on ants is to that extent neutral.

3. A bird feeding on lepidoptera is to that extent probably beneficial. If this is a twilight bird, it is almost certainly so.

4. A bird may be reckoned beneficial in so far as it feeds upon caterpillars with two rows of abdominal prolegs.

5. I can infer little or nothing at present from the presence of diptera in a bird's stomach.

6. Coleoptera, considered in the mass, are to be reckoned injurious. Cicindelidæ, Carabidæ, lampyridæ and coccinellidæ are beneficial. Curculionidæ, cerambycidæ, and some Meloidæ, the tetramerous beetles, leaf-shafers and hard-winged serricornes, are especially injurious.

7. Hemiptera are injurious, on the whole. The aquatic hemiptera, however, are neutral, and reduvidæ, arma and syrtis, are beneficial.

8. Orthoptera may be set down as injurious, except perhaps Blattidæ. Those species which are not now especially hurtful would many of them become so, if their increase were unrestrained.

9. A bird living on small Neuroptera is of suspicious character. It may eat lace-wings. Otherwise, a neuropterous diet is allowable.

10. Myriapodæ are, on the whole, beneficial—Chilopodæ especially so; Chilognathæ neutral.

11. Spiders are beneficial, and birds eating them largely are to be watched. Phalangidæ (harvest-men) are especially to be protected.

In addition to these principles, I drew up a sort of a standard of values—a working table to be used in determining the relative weight to be given to each class of facts observed. As this is somewhat complicated, I will give only a single item to illustrate its character and use. I assumed that 50 per cent. of the beetles eaten by birds are injurious; 25 per cent. are beneficial, and 25 per cent. neutral. Therefore, whenever the material in a bird's stomach was of such a character that I could recognize coleoptera, but could not tell the genus, or even the family, I credited this particular bird with 50 per cent. of benefit, and charged it with 25 per cent. of injury. The other groups of insects are similarly treated.

More definite determinations of the material examined, than those implied above, are often impossible, and to use only such matter as can be *specifically* recognized would cause great waste. Besides, I doubt if a classification within narrower limits is necessary for our purpose. We must not suppose that a bird stops to study the markings on the elytra of a beetle, or to count the joints in its antinnæ, before concluding to swallow it; and a bird that takes one species freely will be very likely to appropriate allied species or congeners of similar habitat.

It will be understood that the percentages of the following table are not so statistically accurate as their form might imply. They simply afford a brief and definite expression of my own *judgment* in the matter, after the most detailed and careful study I have been able to make. Doubtless I shall make myself perfectly understood when I say that I have used, upon a much more complicated subject, the same *marking system*, which is generally employed by teachers as a means of recording their estimates of their pupils' work; and the percentages which I shall now read to you correspond to the term-averages which appear on the reports of your schools. I don't know that any better method has ever been devised for making the closest possible approximation to the truth in a

complex matter, where the decision must depend largely upon the judgment of the investigator.

SCIENTIFIC NAMES.	COMMON NAMES.	NUMBER EXAMINED.	MONTHS.	BENEFICIAL.	INJURIOUS.	NEUTRAL.
Turdus migratorius	Robin	14	6-9	45	22	33
T. mustelinus	Wood Thrush	2	7	55	25	20
Mimus carolinensis	Cat-Bird	6	6-7	27	47	26
Harporhynchus rufus	Brown Thrush	3	6	34	25	41
Silia sialis	Blue Bird	7	4-8	53	10	37
Parus atricapillus	Black-capped Chickadee	2	6-7	80	03	17
Sitta carolinensis	White-bellied Nuthatch	4	7-8	53	24	23
Troglodytes aedon	House Wren	3	7	60	15	25
Eremophila alpestris	Horned Lark	6	6-8	06	03	91
Mniotilta varia	Black and White Creeper	1	5	70	08	22
Dendroeca aestiva	Summer Warbler	4	5-7	58	17	25
Geothlypis trichas	Maryland Yellow-Throat	3	6-7	64	15	21
Setophaga ruticilla	Redstart	3	6-7	58	24	18
Hirundo horreorum	Barn Swallow	1	7	...	80	20
Petrochelidon lunifrons	Eave Swallow	5	7	33	36	31
Vireo olivaceus	Red-eyed Vireo	1	7	80	...	20
V. gilvus	Warbling Vireo	2	6-7	74	03	23
V. flavifrons	Yellow-throated Vireo	3	7	75	08	23
Collurio ludovicianus	Logger-head Shrike	6	6-8	22	20	58
Chrysomitris tristis	Yellow-Bird	5	7,8,10	08	10	82
Pooecetes gramineus	Bay-winged Bunting	1	4	...	...	100
Coturniculus passerinus	Yellow-winged Sparrow	9	6-7	39	11	50
Junco hyemalis	Snow-bird	2	3	...	...	100
Spizella monticola	Tree Sparrow	1	4	10	05	85
S. socialis	Chipping Sparrow	7	6-7	49	08	43
S. pusilla	Field Sparrow	4	6-8	51	11	38
Zonotrichia albicollis	White-throated Sparrow	1	4	47	05	48
Passerella iliaca	Fox Sparrow	1	3	...	...	100
Euspiza americana	Black-throated Bunting	7	6-7	68	07	25
Goniaphala ludoviciana	Rose-breasted Grosbeak	3	6-7	61	17	32
Cyanospiza cyanea	Indigo Bird	6	6-7	19	02	79
Pipilo erythrophthalmus	Ground Robin	4	5, 7	37	15	48
Molothrus pecoris	Cow-bird	3	6-7	35	07	58
Agelaeus phoeniceus	Swamp Blackbird	3	6-7	60	16	24
Sturnella magna	Meadow Lark	3	3,6,7	35	22	43
Icterus spurius	Orchard Oriole	4	6-7	55	20	25
I. baltimore	Baltimore Oriole	2	6-7	55	31	16
Quiscalus purpureus	Crow Blackbird	7	5-7	35	34	31
Cranurus eristatus	Blue Jay	1	5	47	38	15
Tyrannus carolinensis	King-bird	9	6-7	53	20	27
Contopus virens	Wood Pewee	3	3, 7	42	16	42
Other tyrannidæ	Fly-catchers	15	6-7	75	14	11
Chaetura pelasgii	Chimney Swift	1	7	...	80	20
Coceyzus erythrophthalmus	Black-billed Cuckoo	1	5	75	...	25
C. Americanus	Yellow-billed Cuckoo	2	6-7	55	45	...
Picus pubescens	Downy Woodpecker	2	3, 7	42	33	25
Melanerpes erythrocephalus	Red-headed Woodpecker	1	7	50	50	...
Colaptes auratus	Flicker	7	3,4,6,7	...	...	100
Otus wilsonianus	Long-eared Owl	2	3, 5	...	100	...
Falco sparverius	Sparrow Hawk	1	7	...	100	...
Zenaedura carolinensis	Mourning Dove	4	6-7	...	25	75
Cupidonia cupido	Prairie Chicken	1	5	...	...	100
Orteyx virginianus	Quail	1	7	80	10	10
Charadrius tulvus	Golden Plover	1	3	...	...	100
Aegialitus vociferus	Killdeer	5	3, 7	60	...	40
Totanus solitarius	Solitary Father	5	7-8	...	...	100
Ardea egretta	White Heron	1	...	...	...	100
Rallus elegans	Marsh Hen	1	7	...	...	100
Podylymbus podiceps	Pied-billed Grebe	1	7	...	...	100

I have, of course, kept full notes of the facts upon which these conclusions are based, but I have thought it hardly worth while to include

the whole mass in this paper. They can be turned over to whoever carries on this investigation for you hereafter, if it is to be carried on, and incorporated with the results of further study.

MR. WIER said: I am pleased with this paper of Prof. Forbes. We have heretofore been disposed not to discriminate between the birds—those that befriend us and those that injure us. I am glad to see that the Cat-bird has got its deserts in that paper. He is the worst bird in the premises, and should be destroyed on all occasions.

MR. BRYANT, Sen., said there was another bird, the Blue Jay, that was especially obnoxious, inasmuch as it expelled the Blue Bird and other birds that were useful on the farm. The Blue Jay must be classed with those birds that are "worthy of death."

D. B. WIER'S report upon the same subject was called for, when he answered that his report was embraced in that of the committee appointed by the State Horticultural Society last year, to take into consideration a systematic and co-operative plan for combating insects noxious to horticulture, and also collaterally the preservation of beneficial insects and birds.

MR. O. B. GALUSHA is the Secretary of that committee, and has sent in the report, which is here submitted. The committee are not responsible for the statements given in parenthesis. They are presented as further illustration of the subject, but on his authority alone.

Secretary Galusha's Report was then submitted, to which is added D. B. Wier's parenthetical notes.

HORTICULTURAL ENTOMOLOGY.

At the last meeting of the State Horticultural Society, at the request of our State Entomologist, Prof. Cyrus Thomas, of Carbondale, Ill., a committee of practical horticulturists was appointed to take under consideration a systematic and co-operative plan for combating insects noxious to horticulture, and also collaterally the preservation of beneficial insects and birds.

The committee, or commission, were called together and met at the Normal University, Normal, Ill., on the 29th of February. Unfortunately, the press of work, owing to fine, warm weather and sickness, prevented some, who would have been very valuable helpers in this work, from being present, but the commission organized on the morning of the 29th for work. The committee had invited to sit with the commission the following specialists: Prof. Cyrus Thomas, State Entomologist; Prof. T. J.

Burrell, of the Illinois Industrial University, at Champaign, professor of vegetable physiology, horticulture, and cryptogamist; Prof. A. S. Forbes, of the State Normal University at Normal, Ill., professor of natural history and ornithology; and also some of the prominent horticulturists of the State.

Prof. Thomas was called to the chair *pro tem.*, and O. B. Galusha was chosen secretary.

It was resolved to limit the investigations and discussions, for the present, to the nursery and orchard. (The reader will please bear in mind that the rules laid down, or the recommendations, are such as will, in the opinion of the commission, clear the ground, in a great measure, of injurious insects, and the best known means of combating and destroying them when injuring the trees.)

I.—Nursery Operations.

1 *a.—Preparation of the Soil before Planting.*

Ground to be used for seeds, grafts or cuttings should be cleaned of rubbish, and cultivated without a crop of any kind (fallow plowed), and plowed late in the fall, at least one season before planting. This will, in a great measure, free the soil from noxious insects, notably the white grub, larvæ of the May beetle (*Phyllophaga fusca*), the wire worms, larvæ of the Elators, (these wire-worms would not be entirely destroyed, but generally), all the noxious worms known as cut worms, particularly those that are destructive early in the spring, the striped plant bug (*Capsus olilinneatus* or *Phytocoris lineolaris*)—though this being an insect that flies strongly, the remedy would only be partial—nearly all the caterpillars that pass the winter in the larvæ or pupa state, and would also be a great help in freeing the land from leaf-destroying insects of various kinds.

By clearing off rubbish is meant, the cleaning of the ground of all such matter as cannot readily be plowed under and would not readily decay, so as to make plant food; and in localities where the disease known as "rotten root" prevails, all decaying wood should be carefully removed.

2 *a.—Planting Grafts, Seeds, Seedlings and Cuttings.*

All these should be carefully examined for the eggs of noxious insects, such as bark-lice, leaf-lice, root-lice, etc. Apple seedlings should be carefully examined, and if any indications of the woolly-root aphis or woolly apple-root plant-lice are seen on them, the whole lot of seedlings should be carefully washed in strong soap-suds, and packed away for a few days in saw-dust before grafting them. Cions for grafting should not be used if infested with eggs of leaf-lice, aphides (very small, shiny black globules stuck on the surface), and bark-lice (*coccidæ*)—small scale-like things, the worst of which is shaped like the one-half of an oyster shell,

known as the oyster shell bark-louse, and the color of the bark, others more flattened and whitish, unless they can be *entirely* removed. It is only safe to entirely reject such cions; if only a few out of thousands are used that are infested with these bark-lice, they will infest the whole nursery; a few cions of a special variety might be cleared from them.

3 *a.—Cultivation the First Year.*

Thorough and clean cultivation from planting until the first of August for grafts and seedlings, and other things to be taken up in the fall, until they are taken up. This clean culture not only keeps noxious insects from accumulating, but gives the plants vigor to withstand their attacks, and also of mildew (fungi). The plants should not be too crowded in the rows, as this would induce a weak growth, rendering them liable to attacks of mildew and insects. Apple grafts should not be cultivated later than the middle of July to the first of August, and at the last working should have corn or oats sown thickly among them, or the seed for a crop of fall turnips; this to check and ripen up for winter. No sod-forming grasses should be allowed to grow near the nursery, as it affords breeding places and hiding (wintering) places for many noxious insects, such as white grubs (young of the May beetle), with worms (larvæ of Elators), cut worms (various larvæ of *Agrotis*), army worms (larvæ of Lucania), and of numerous species of leaf-hoppers.

Insects and mildews (fungi) injurious to the leaves of seedlings and root grafts, can be kept in subjection or destroyed by a free use of the following combination of lime and sulphur—it may be called the bi-sulphate of lime: Take of quick or unslaked lime 4 parts, and of common flour of sulphur 1 part (4 pounds of sulphur to one peck of lime); break up the lime in small bits, then, mixing the sulphur with it in a tight vessel (iron best), pour on them enough boiling water to slake the lime to a powder, cover in the vessel close as soon as the water is poured on. (This makes also a *most excellent* whitewash for orchard trees, and is very useful as a preventive of blight on pear trees, to cover the wounds in the form of a paste when cutting away diseased parts; also for coating the trees in April. It may be considered as the one *specific* for many noxious insects and mildew in the orchard and nursery. Its materials should always be ready at hand; it should be used quite fresh, as it would in time become *sulphate* of lime, and so lose its potency. Wherever dusting with lime is spoken of, this should be used. This preparation should be sprinkled over the young plants soon as, or before, any trouble from leaf-lice (*Aphides*), mildew, mould (fungi), thrips or leaf-hoppers appear, early in the morning, while the dew is on. (This lime and sulphur combination is destructive to these things in this way: firstly, by giving off sulphuric acid gas, which is deadly poison to minute life of nearly (?) every kind, both animal and fungoid; and the lime destroys by contact the same things. Besides, its presence is noxious to them. Neither is injurious to common vegetable life, except in excess, except the lime to the foliage of evergreens.)

NOTE.—The above applies especially to the first year of the nursery.

4 a.—Cultivation in the Second and Subsequent Years in the Nursery, as applicable especially to the Apple, with reference to freedom from injury by Insects and Fungoid Parasites.

1st. Cultivation of the soil similar to that of the first year. 2d. The sulphur and lime to be used the same as the year before. The first thing to be looked after in the winter or early spring is the larvæ of the leaf-crumpler (*Physita nibula*). This is readily discovered; as a little bunch of dried leaves strung to the twigs by a silken thread, the larvæ will be found in this, encased in a little horn-shaped case. These should be carefully picked off and destroyed. (It is best not to burn or crush these, as many of them are parasitized; if not destroyed, the parasite, being mature, will develop, and go on with its good work; while if the Physita larvæ are merely "dumped" on the ground a little way from any trees, it at this time not being mature, will certainly starve.) Hand picking is the only remedy for these crumplers, as well as for other small noxious and sometimes *very* destructive caterpillars, to wit: the Lesser Apple Leaf-folder (*Tortrix Malivarona*), known by its usually folding together the apex of a leaf, and feeding between the folds; the Apple Leaf-folder and the Apple Leaf Sheletonoyer. Of these, the first one is protected from destructive applications by the folds of the leaf on which it feeds; and the last one by a web which it spins, and under which it feeds. The last may be seen by a brown patch near the base of the leaf; these are the larvæ of quite small moths, and as these are generally two or more brooded, great care should be taken to destroy the first brood in the larvæ state, by searching for and crushing them between the thumb and fingers, as it appears there is no other way of reaching them. If the first brood are *all* destroyed, there can be no *second brood*. They should be carefully sought for from about the middle of June to the first of July, and destroyed. The lime and sulphur will be of great help in holding them in check. Borers are sometimes injurious in the nursery, but will be found under the next head.

II.—Orchard Culture.

1 b.—Trees for the Orchard should be sound and free from Insects, and the Eggs of Insects.

If infested with bark-lice (*coccidæ*), they should be rejected; if with root-lice, their roots should be thoroughly washed in strong soap-suds. Eggs of the White Tussock moth should be destroyed.

2 b.—Selection of Site and Preparation of the Soil.

The orchard should have a high, dry, well-drained situation, soil neither too rich nor poor, as such a location is more free from noxious insects and fungi than low, wet poorly drained situations (?), and the trees make a stronger matured growth, therefore better able to withstand climatic changes and the attacks of insects and fungi. If such a proper selection is made, it needs no other preparation than such as would be

sufficient for planting a corn crop. The cleaning of the ground should be the same as recommended for the nursery.

3 *b.—Trees for Planting in Orchard should have branches low enough to partially shade their trunks, and when planted should lean considerably to the southwest.*

This leaning should be done to prevent the damage to the southwest side of the trunks, commonly known as "sun scald," which invites attacks of the flat-headed apple tree borer (*Chrysobothris femorata.*)

4 *b.—Cultivation of the Orchard before coming into Bearing, i.e., the first five to eight years.*

It should be planted with corn, if the land is rich; if thin, in potatoes or other suitable hoed crop. When the trees are old and large enough to bear, the orchard should be sown in red clover (but in no case should small grain or any of the perennial grasses be sown in it); if the growth is too strong (vigorous) to check growth and throw it into bearing. Clover harbors and feeds less noxious insects than any grass-like plant that makes a close sod, and should always be used for this purpose. (Plowing—*i.e.*, breaking up of the soil—should always be done, if possible, before the starting of growth in the spring; the summer culture with the harrow and cultivator alone, so as not to destroy the roots in the growing season.) Late fall plowing, though not recommended as a rule, will be found of great use occasionally, in destroying and keeping in check the canker worm, grub of the May beetle, the climbing and other cut worms, tarnished plant bug, and the bugs and chrysalids of other noxious insects that pass the winter in the grub or larvæ state. (Such plowing should in all cases be shallow, and if the canker-worm or grub is present, great care should be taken to turn and break up *all* the soil; where it cannot be reached under the trees with the plow, the spade should be used.)

Orchardists should bear in mind that continued healthy vigor of the trees throughout their lives (not too rampant) is essential, to enable them to withstand the attacks of noxious insects, and to enable them to recuperate when attacked; therefore, if the trees at any time present a sickly or unthrifty condition, the soil should be manured or cultivated (or both.)

5 *b.—Mulching, whenever Mulching is applied.*

The portions immediately about the collar of the tree should be mixed with ashes or lime, to prevent noxious insects from working and harboring there.

III.—Care of the Trees.

1 *c.—Pruning, so far as relates to Insects only.*

Twigs during the winter season, upon which the eggs of injurious insects are seen, should be cut off and burned, if the eggs cannot be read-

ily and completely destroyed in some other way—such as hand-picking, crushing, etc. These include the eggs of the tent caterpillars, which are found 300 to 400 cemented in a bunch, surrounding a twig; eggs of the tree hoppers, which are found in little slits immediately beneath the outer bark; eggs of leaf-lice, minute, shining, black globules scattered upon twigs of the last year's growth.

2 *c.—A General Cleaning of the Trees in Winter should be carefully attended to.*

By picking off all cocoons, leaf-crumplers, basket or drop worms, eggs of the Tassock moth found on sides of deserted cocoons, etc. (Old trees, neglected heretofore in orchards, should have their trunks carefully scraped of all rough bark; but if the following directions are followed, there will be no scales of bark to scrape off.) The trunks and larger branches of the trees should be washed at least once each year with soft soap (thinned somewhat), or a strong alkaline wash, between the middle of May and middle of June (according to latitude), and if washed off soon by heavy rains, should be renewed; this renders them free of rough scales of bark, which harbors many noxious insects and parasitic plants, and is an effectual remedy against attacks of the flat-headed apple-tree borer (*C. femorata*), which is very destructive in the middle and southern portions of this State. In the northern portions of the State, the round-headed apple-tree borer (*Saperda bivitata*) preys upon the tree near the surface of the ground; therefore, in April or May a small portion of the soil should be removed from the collar of the tree, and this should be filled in and mounded up a little with lime or ashes. This mounding up prevents the beetle laying her eggs so low down on the trunk as that access to the larvæ would be difficult, (besides, the lime ashes and the soap, as alkaline washes, are all obnoxious to her.) This beetle deposits her eggs during the months of June, July and August, but mostly in June and July, on the trunk of the trees near the ground—rarely in the branches or under the surface. The trees should be carefully examined for the borers during the last half of September, and if any are found their burrows should be opened and the larvæ (young borers) killed. If they have penetrated deeply, they may be punched to death with a flexible twig or wire. Their burrows may be readily found by the reddish-brown castings thrust from them. (This is the most insidious foe of the apple orchardist, in the north part of the State, and too much pains cannot be taken in ridding the trees from them.

The larvæ of the flat-headed apple-tree borer may be found in the trunk and at the base of the larger branches (and in or near any patches of sun scald, wounds or abrasions, and near the base of dead limbs), by a little discoloration of the bark; and by taking off a thin shaving of the discolored bark, the larvæ may be seen and destroyed. This work should be done in the months of August and September. (If the larva has penetrated deep into the wood, it will often be found best not to cut it out, as the wound made in doing so would be worse than the injury done by

the grub if left alone. A place attacked by this grub on a tree is most liable to be so again the next year, therefore should be carefully watched.

Trees infested by bark-lice may be partially cleared of them by washing with an alkaline wash (and thoroughly dusting with the lime and sulphur compound), at the time the young are hatched out, which is from May the 1st to June the 15th, according to season and latitude. (These young lice are very small and delicate; when hatched from the eggs under the scales, they crawl around for a few days and then fix themselves to the bark, and never move again, and soon become covered with a hard shell, which acts as a protection, and a most perfect one, too, during the rest of their existence; hence they are hard to destroy, except when in the young (moving) state. These lice, though small and insignificant-looking things, are exceedingly hurtful to trees infested with them; their immense number, sucking the vital juices of the trees during the entire season, fearfully weakens them, and too great pains cannot be taken to prevent their gaining a foothold in the orchard, and to destroy them if they should.

Fine lime dust, sprinkled over the trees at this time, is not only useful for these young bark-lice, but also for leaf-lice (*aphidas*) and the codling-moth.

Nests of the tent caterpillar, fall web-worm, and other insects that feed and nest together (gregarious), should be carefully removed from the trees and destroyed. (*Item.*—Be careful that the caterpillars are *in their nests* when taking them off.)

For the destruction of the canker-worm (*Anesopteryx pometaria*), the rope bands, with encircling tin bands, as recommended by Dr. LeBaron, is recommended. See Illinois State Horticultural Society's Report, Vol. IX., page 122. The late fall plowing already spoken of destroys a large portion of the chrysalids of this insect, and when done for this purpose, should be as late (and the soil all carefully turned over and broken up, especially under the trees near the trunk), and left as rough as possible.

1 *d.—Protection of the Fruit from Insects.*

The codling moth, or core-worm of the apple (*Carpocapsa pomonella*) is best combated by thoroughly dusting the trees from above downwards, so that it may fall into the calyx of the young apples, with the lime and sulphur preparation finely powdered. This should be done immediately after the petals of the flowers fall, and the young fruit begins to form. If delayed too long, the worm will have entered the apple, and be out of reach of the lime. (The lime dust is also very distasteful to the moth. The egg from which this apple-worm is hatched is laid by a small, nocturnal moth, in the calyx or blossom end of the apple; it soon hatches, and the young caterpillar eats its way into the core of the apple, where it feeds about thirty-four days, when it eats its way out and seeks a secure hiding-place in which to spin its cocoon, and undergo its transformations. In its cocoon it soon changes to a pupa, and in about twelve days emerges as a moth, ready in a few days to lay its eggs in the apples. The use of the

bands spoken of below is to entrap the insect while in its cocoon.) The best means for entrapping the larvæ of this insect are the cloth, paper (or wooden) bands, as have been often described. These may be old cloths of any kind, carpets, woolen or other cloth garments of any kind, torn in strips three to four inches wide, coarse, cheap straw or felt paper, untarred building paper, veneering cut as for berry boxes, etc., in strips three to six inches wide, and wrapped around the tree two or more times, and tacked or tied fast. If the trees are clear of rough bark, the larvæ will seek these bands, as being the best available place in which to spin their cocoons, and the bands can be examined and the insects destroyed. These bands should be placed around the trees as early as the 10th of June, for Central Illinois; a week earlier for the south, and *must* be examined as often as once in twelve days, and the insects destroyed during the balance of the season. (The last brood of worms, on leaving the apples, spin their cocoons, but remain as worms during the winter, and do not change to the pupa state until the following spring; hence all barrels and bins in which apples have been stored will be full of these larvæ in their cracks and crevices. They should be hunted out and destroyed. Many moths may be destroyed on the windows or cellars where apples have been stored.)

IV.—Birds.

1st. Those of the greatest value to the fruit-grower in destroying noxious insects, and which should be encouraged and fostered in every way.

Note.—The thanks of the commission (and so should be those of the people of the whole State) were tendered to Prof. S. A. Forbes, curator of the Museum and professor of natural history in the State Normal University at Normal, Ill., for his most diligent research into the food and general habits of the birds of our State, for the purpose of demonstrating their value as destroyers of *noxious* insects and their eggs, and as to whether some that are also of value as insect-destroyers are not so noxious in destroying fruit as to render them noxious. This is a very intricate question, requiring as yet an immense amount of research and experience before all points can be officially and scientifically determined; and I hope our critics, if there be any, will not too hastily pass judgment on our conclusions—arrived at, as they were, after consulting our own experience and the best authorities on the subject. Frof. Forbes is still at work on this branch of natural history, and has a large amount of material, in the shape of birds' crops in alcohol, yet to examine, and will gladly receive *hints* from all parts of the State, also the *heads* of birds, with the crops attached, either *dried* or in *alcohol*, for examination for the public benefit. Also specimens of noxious insects, reptiles, abnormal growths, fungi, etc.

Blue birds, Tit-mice or Chicadees; Warblers (small summer birds, with pleasant notes, seen in trees and gardens); Martens; Swallows; Vuros (small birds called green-necks); all birds known as woodpeckers except the sap-sucker (*Picus varius*); this bird is *entirely injurious*, as it is not insectivorous, but feeds on the inner bark cambium (and the elaborated sap) of many species of trees, and may be known from other woodpeckers by its belly being yellowish, a large black patch on its breast, andthe top of its head of a dark, bright red; the male has also a patch

of the same on their throats, and with the inner margins of the two central tail feathers white. This bird should not be mistaken for two others, most valuable birds which it nearly resembles, to wit: The Hairy Woodpecker (*Picus Villosus et vars*), and the Downy Woodpecker (*Picus pubescens et vars*). These two species have the outer tail feathers white (or barred with black), and have only a small patch of red on the back of the heads of the males only. (The Yellow-Hammer, or Flecker, *Colaptus auratus*, is somewhat colored with *yellow*, and should not be mistaken for the Sap-Sucker; it is a much larger bird.) The Red-headed Woodpecker (*Melonerepes erythrocephalus*) sometimes pecks into apples, and devours cherries, and should be placed in the next division (2 *d*). The Wrens, Ground Robin (known as Chewink), Meadow Lark, all the Fly-Catchers, the King Bird, or Bee-Catcher, Whip-poor-will, Night Hawk, or Goat-Sucker, Nut-hatcher, Pewee, or Pewit. All the Blackbirds, Bobolink, (!) American Cuckoos, Plovers, Snipe (Upland), Grosbeaks and other Finches (*Fringillidæ*), Quails, Song Sparrow, Scarlet Tanager, Black, White and Brown Creepers, Maryland Warbler, Indigo Bird, Chirping Sparrows, Black-throated Bunting, Thrushes, except those named in the next class, and all domestic fowls except geese.

2 *d.—Birds of doubtful utility.*

Which includes those which have beneficial qualities, but which have also noxious or destructive qualities, in the way of destroying fruits, other birds and their nests, and whose habits are not fully determined. (Thus the Robin, Brown Thrush and Cat-bird are *very* valuable as cut-worm eaters, but also *very* obnoxious to the small fruit-grower. The Jay (Blue Jay) is not only destructive to grains and fruits, but very noxious in the way of destroying the nests, eggs and young of smaller and better birds. I think that notwithstanding his great beauty and sauciness, that he should be placed in the last list.) Robin, Brown Thrush and Cat-bird, Shrike, or Butcher Bird, Red-headed Woodpecker, Jay-bird or Blue-jay, Crow and the small Owls (screech owls), Pigeons and Mocking Birds. There are many other birds that should be placed in one or other of the foregoing lists; but it will be safe, as a rule, to preserve all birds not named in the two last lists. Those in the second list, the commission thought, should not be preserved by legal enactments, but leave each person to have his option as to destroying them or not. Those named in the next and last list should be destroyed by all, whenever opportunity offers.

3 *d.—Birds that should be exterminated.*

Sap-Sucker, or Yellow-bellied Woodpecker (see above), Baltimore Oriole, or Hanging Bird, (oh, what a pity,) Cedar Bird, or Wax-wings (*Ampelis cedrorum*), Hawks and the larger Owls.

V.—Preservation of Beneficial Insects.

(There was not time to give this important subject the consideration it deserves; persons often make very serious mistakes when being damaged

by insects. I have seen persons, when their trees had been damaged by leaf-lice, busily employed in destroying young lady-birds, which had just completed the job of eating up the leaf-lice, and were in great numbers running over the trees, busily engaged in searching for more. Toads, frogs and lizards should always be very carefully preserved. Always be sure you are right, then go ahead. For instance, my grounds, orchard and nursery, three years ago, at this time, were very seriously affected by the apple-leaf crumpler. I discovered that a few of them contained parasites. I hired boys to gather them, and instead of burning them, as recommended, I merely threw them on a piece of bare ground; the parasites being mature, developed, the crumplers, not being mature, *starved;* to-day I find the crumpler *very* scarce, and nearly every one parasitized on my place. I could give other instances leading to the same happy results.)

Great care should be taken of the beetles known as lady-birds (*Hippodamias and Coccinelles*), small, oval, turtle-shaped beetles, which may be generally known by their being marked black with red spots, red with black spots, and yellow with black spots. These are very common everywhere; they are the most insidious foe of leaf-lice (*Aphides*), bark-lice (*coccidæ*), and many other noxious insects. The larvæ or young of these lady-birds have the same general characteristics of the young of the Colorado potato beetle—(and their eggs closely resemble those of the potato beetle, only they are smaller and in smaller clusters, and as they are often deposited on the same plant, care should be taken not to destroy lady-bird eggs when mashing those of the potato bug, as I have often seen done; both the lady-bird and its larvæ are *very* voracious in hunting up and eating the eggs of this potato beetle)—only smaller, more slender, quicker in motion, and always shiny on the sides and back. At the next meeting of the commission this part of the subject will be given *further attention.*

VI.—Cryptogamic Parasites, *i. e.*, Moulds, Mildews, Etc.

(Prof. T. J. Burrill, of our State Agricultural University, at Champaign, Ill., has this department under special study, and will, no doubt, in the future, give some very valuable facts. He will be pleased to receive specimens of plants and fruits infested with mould or mildew, and be pleased to give any information regarding such diseases possible. Prof. Burrill coincided with the majority of the commission in recommending the lime and sulphur remedy as given heretofore, and reported as follows on fungi noxious to the fruit growers):

The peach rot is the result of a fungus which also preys upon the leaves of some varieties, particularly of the serrate kinds. The dust from a decayed fruit is the spores—(spores fulfill the same office to fungi that seeds do to plants generally)—of the fungus. These spores germinate only in presence of moisture, hence the rot is worse in wet times, and upon fruit whose skin is punctured by insects.

Gathering the affected fruit as soon as observed, and before the dissemination of the spores, and burning or burying them, is the best remedy. Old rotten peaches should not be allowed to remain upon the trees during the winter. The same fungus injures plums and cherries.

The grape leaf mildew (fungus) is occasionally very destructive in damp, warm seasons. If taken early, a complete preventive is found in sulphur dusted over the leaves. (I have no doubt but that the lime and sulphur combination would be a *better* and much cheaper application for this purpose.)

The striped (prairie) ground squirrel digs up for food the May beetle, both in the imago and larvæ, sometimes destroying great numbers of them. (This is a very strange *fact*, and shows how easily we may be mistaken in facts concerning animal life; this shows us that this beautiful little creature, which has by all been considered very noxious to the farmer, is one of his *very best friends*, and should be most religiously preserved; his faults, digging up a little corn, can be easily overcome in many ways, notably, by giving it plenty of corn to be had without the digging; if this little animal eats May beetles, he undoubtedly eats other noxious, vegetable feeding beetles.) The beneficial cannibal insects (*Crabidæ*) are not preyed upon to any extent by birds and animals, for the reason that they have good protection in their being very high flavored. We have many other small animals, which are ruthlessly destroyed, that should be most carefully fostered, notably, the common mole, shrew mice, bats, skunks (?), (one of the very best, but rather high flavored,) raccoons, opossums (?). Let them have a few chickens, etc.

NOTE.—The English sparrow was left out by accident in its proper connection, but Prof. Forbes requests me to say, that after consulting all available authorities, and by personal inquiry, that the balance sheet shows a slight preponderance of testimony in its favor as a valuable insectiverous bird, but that he is not inclined to extend to it the *par excellence* value that many have ignorantly claimed for it. For one, I am fully inclined to believe that great wrong has been done by importing this fighting, mischievous bird, believing that it will drive more beautiful and beneficial birds entirely from our gardens, orchards and groves.

To this paper is annexed the following appendix giving the scientific names of the different families of birds.

APPENDIX.

SCIENTIFIC NAMES OF FAMILIES OR SPECIES OF BIRDS IN THE FOREGOING LISTS, IN THE ORDER ENUMERATED.

FIRST CLASS—BIRDS TO BE PRESERVED.

1. BLUEBIRD—Family, SAXICOLIDÆ; genus, *Sialia;* species, *Sialia sialis* (Linn.)
2. TITMICE—Family, PARIDÆ; subfamily, PARINÆ; genus, *Lophophanes;* species, *L. Bicolor* (Linn.); genus, *Parus;* species, *P. Atricapillus* (Linn.), and *P. Carollnensis* (Aud.)
3. WARBLERS (American)—Family, MNIOTILLIDÆ; genus, *Mniotilta;* species, *M. varia* (Linn.), (black and white creeper, striped creeper); also the group VERMIVORÆ (the worm-eating warblers); the group DENDROICÆ (the wood warblers); the group GEOTHLYPEÆ (the ground warblers, including the Maryland yellow-throat); group ICTERIÆ (chat warblers); genus, *Icteria;* species, *I. virens* (Linn.) (yellow-breasted chat—"yellow mocking-bird"); genus, *Setophaga;* species, *S. ruticilla* (red-start, black-and-red fly-catching warbler).
4. KINGLETS (Ruby-crowned and Golden-crowned Wrens)—*Regulus calendula* (Linn.), (ruby-crowned), and *R. satrapa* (Licht.), (golden-crowned).

5. NUTHATCHES—*Sitta carolinensis* (Lath.), (white-bellied nuthatch tomtit), and *S. canadensis* (Linn.), (red-bellied nuthatch).

6. CREEPERS—*Certhia familiaris* (Linn.), (brown creeper).

7. WRENS—*Thyrothoeus Ludovicianus* (Lath.), (great Carolina wren); *Thryomanes Bewickii* (Aud.), (Bewick's wren, long-tailed house wren); *Troglodytes ædon* (Vieill), (house wren, short-tailed house wren); *T. paroulus* (Koch.), *var. hyemalis* (winter wren, bunty wren).

8. MARTINS—*Progne subis* (Linn.) (purple martin, house martin); *Petrochelidon lunifrons* (Say), (cliff swallow, mud swallow, eave swallow); *Hirundo horreorum* (Bartr.), (barn swallow); *Tachycineta bicolor* (Vieill), (white-bellied swallow, tree swallow); *Cotyle riparia* (Linn.), (bank swallow, sand martin); *Stelgidopteryx serripennis* (Aud.), (rough-winged bank swallow, "sand martin").

9. VIREOS—The Greenlets—Family, VIREOMDÆ; genus, *vireo. Vireo oliva ceus* (Linn.), (red-eyed vario); *V. Philadelphicus* (Cass), (Philadelphia vireo); *V. gilvus* (Vieill), warbling vireo); *V. solitaria* (Wils.), (blue-headed vireo); *V. flavifrons* (Vieill), (yellow-throated vireo); *V. noveboracensis* (Gmel.), (white-eyed vireo); *V. Bellii* (Aud.), (Bell's vireo).

10. TANAGERS—Family, TANAGRIDÆ; genus, *Pyranga. P. rubia* (scarlet tanager, "black-winged red-bird"); *P. æstiva* (Gmel.), (vermilion tanager, "summer red-bird").

11. FINCHES—Family, FRINGILLIDÆ; species, *Carpodacus purpures* (Gmel.), (purple finch).

12. SPARROWS—(Same family)—*Spizella pusilla* (Wils.), (field sparrow); *S. pallida* (Swain's), (clay-colored sparrow); *S. socialis* (Wils.), (chipping sparrow); *Melospiza melodia*, (Wils.), (song sparrow).

13. BLACK-THROATED BUNTING—(Same family)—Species, *Enspiza Americana* (Gmel.), ("little field lark," Dick Cissel).

14. INDIGO BIRD—(Same family)—*Cyanospiza cyanea* (Linn.), ("green linnet").

15. CARDINAL GROSBEAK—(Same family)—*Cardinalis Virginianus* (Briss), (red-crested bird, "corn cracker").

16. GROUND ROBIN—(Same family)—*Pipilo erythrophthalmus* (Linn.), ("chewink," "charee," "swamp robin").

17. BLACKBIRDS—Family, ICTERIDÆ; all the subfamily, AGELAINÆ. *Dolichomyx onyzivorus* (bob-o-link, skunk blackbird, etc.); *Molothrus pecoris* (Gmel.), (cow blackbird, "clod-hopper"); *Xanthocephalus icterocephalus* (Bonap.), (yellow-headed blackbird); *Agelaius phœniceus* (Linn.), (red-winged blackbird, swamp blackbird); *Sturnella magna* (Linn.), meadow lark, "field lark"); *Quiscalus versicolor*, var. æneus (Ridgway), (bronzed grackle, western crow-blackbird).

18. FLY-CATCHERS—Family, TYRANNIDÆ. *Tyrannus Carolinensis*, (kingbird, bee-bird, bee martin); *Myiarchus crinitus* (Linn.), (great-crested fly-catcher); *Sayornis fuscus* (Gmel.), (pewee, phœbe-bird); *Contopus borealis* (Swains), olive-sided wood pewee, great wood pewee), and *C. virens* (Linn.), (wood pewee); *Empidonax pusillus* (Swains), var. Traillii (Aud.), (Traill's fly-catcher); *E. minimus* (Baird), (least fly-catcher); *E. Acadicus* (Gmel.), (Acadian fly-catcher), and *E. flaviventris* (Baird), (yellow-bellied fly-catcher).

19. CUCKOOS—Family, CUCULIDÆ. *Coccygus Americanus* (Linn.), (yellow-billed cuckoo, "rain crow," "wood pigeon"); *C. erythrophthalmus* (Wils.), black-billed cuckoo, red-eyed cuckoo).

20. NIGHT HAWKS—Family, CAPRIMULGIDÆ. *Caprimulgus vociferus* (Wils.), (whip-poor-will); *C. Carolinensis* (Gmel.), (chuck-will's-widow); *Chordeiles popetue* (Vieill), (night hawk, bull bat).

21. THE SWIFTS—Family, CYPSELIDÆ. *Chætura pelagica* (Linn.), (chimney swallow, chimney swift).

22. The Woodpeckers — Family, PICIDÆ. *Picus villosus* (Linn.), hairy woodpecker); *P. pubescens* (Linn.), (downy woodpecker); *Picoides articus* (Swains), (black-backed three-toed woodpecker); *Melanerpes Carolinus* (Linn.), (red-bellied woodpecker, "checkered woodpecker," "woodchuck"); *Colaptes auratus* (Linn.), (golden-winged woodpecker, yellow hammer, yellow-shafted flicker, flicker, high-holder, wakeup, etc.)
23. The Plovers — Family, CHARADRIDÆ *Charadrius pluvialis* (Linn.), var. *Virginicus* (golden plover); *C. helveticus* (Linn.), (black-bellied plover); *Ægialitis vociferus* (kill-deer plover); *Æ. hiatacula* (Linn.), (ring-necked plover), and *Æ. melodus* (Ord.), (piping plover).
24. Prairie Snipe — Family, SCOLOPACIDÆ. *Actiturus Bartramius* (Wils.), (prairie plover, field plover, upland plover).
25. Quail — Family, PERDICIDÆ. *Ortyginæ Virginianus* (Linn.), (Virginia quail, partridge, Bob White).

SECOND CLASS—BIRDS NEITHER CONDEMNED NOR WHOLLY COMMENDED.

1. Thrushes — Family, TURDIDÆ. *Turdus Mustelinus* (Gmel.), (wood thrush, bell bird); *T. fuscescens* (Steph.), (tawny thrush, Wilson's thrush); *T. pallasii* (Caban), (hermit thrush, rufons-tailed thrush); *T. migratoris* (Linn.), (robin thrush, common robin, "robin redbreast"); *Galeoscoptes Carolinensis* (Linn.), (cat-bird); *Minus polyglottus* (Linn.), (mocking bird, "southern mocking bird"); *Harporhynchus rufus* (Linn.), (brown thresher, sandy mocking bird).
2. Shrikes — Family LANIIDÆ. *Collurio borealis* (Vieill), (great northern shrike); *C. Ludoviceanus* (Linn.), (butcher bird, white-rumped shrike, mocking bird, western loggerhead).
3. Savana Bunting — Family, FRINGILLIDÆ. *Passerculus savanna* (Wils.)
4. Crow — Family, CORDIVÆ. *Corvus Americanus* (Aud.)
5. Blue Jay — (Same family) — *Cyanura cristata* (Linn.)
6. Red-headed Woodpecker — *Melanerpes erythrocephalus* (Linn.)
7. Saw-whet Owl — Family, STRIGIDÆ. *Nyctale acadica* (Gmel.), (white-fronted owl, Kirtland's owl).
8. Screech Owl — *Scops asio* (Linn.), (little red owl, mottled owl).
9. Horned Lark — Family, ALAUDIDÆ. *Eremophila alpestris* (Linn.), (snow lark).
10. Orchard Oriole — Family, ICTERIDÆ. *Icterius spurius* (Linn.)
11. Pigeons — Family, COLUMBIDÆ. *Ectopistes migratoria* (Linn.)

THIRD CLASS—BIRDS TO BE DESTROYED.

1. Cedar Bird — Family, AMPELINÆ. *Ampelis cedrorum* (Vieill), (cherry bird, southern wax-wing).
2. Baltimore Oriole — Family, ICTERIDÆ; subfamily, Icterinæ. *Icterus Baltimore* (Linn.), (fire bird, golden robin, hang-nest, hanging-bird).
3. The Larger Owls — (*Raptores*) — Family, STRIGIDÆ. *Striginæ flammea* (Linn.), (barn owl); *otus vulgaris* (long-eared owl, lesser horned owl); *O. brachyotus* (short-eared owl); *Syrnium nebulosum* (Forst.), (barred owl, hoot owl); *S. cinereum* (Gmel.), (great gray owl); *Bubo Virginianus* (Gmel.), (great horned owl, "cat owl").
4. Hawks — Family, FALCONIDÆ — the entire family of hawks in the State, embracing *Falconinæ columbarius* (Linn.), (pigeon hawk); *F. Sparverius* (Linn.), (sparrow hawk and eighteen other species).
5. Yellow-bellied Woodpecker — Family, PICIDÆ. *Sphyropicus varius* (Linn.), (yellow-throated woodpecker).

The commission adjourned after unanimously thanking certain citizens of Normal for their generous hospitality and the eminent scientists present for their counsel, and Prof. Forbes and executive of the Normal for use of rooms to meet in, and library and specimens for reference; and, personally, I would add that if my notes included in this report, prove of any use to my brother fruit-growers, I will be well paid for jotting them down in this busy season of the year.

DISCUSSION.

But little discussion followed these reports, for want of time.

Mr. Cochrane (of Blue Island) asked if any one had experience with the English Sparrow? Is it not true, that the Sparrow is driving away every other bird.

Mr. Wier—I think that in introducing this bird, we have introduced a nuisance. It is true, that the English Sparrow is driving away other more valuable birds.

Prof. Standish (of Galesburg) said, that their local society had it in mind to introduce the English Sparrow. He believed with Mr. Wier, that they were injurious, by driving away other birds. Still, in the East, they were useful in destroying caterpillars, which otherwise became so numerous as to entirely defoliate the trees — they were of some service. But they disfigure the buildings, when they become plenty. They were dirty things, and he was inclined to think that they were properly denominated a *nuisance.*

Prof. Forbes wished it understood that his paper was only a step in the right direction. The work of investigation is going on, and the paper simply reports progress. Not enough is yet known to pronounce definite conclusions. It was proposed to follow up this line of investigation till some practical and useful results were reached.

WEDNESDAY MORNING.

President Hammond called the meeting to order at 9 o'clock. O. L. Barler was called upon to open the exercises with prayer.

REPORT OF COMMITTEE ON ORCHARD CULTURE.

S. G. Minkler read the following paper on orchard culture:

Mr. President and Gentlemen of the Illinois Horticultural Society:

Your Society asked me to prepare a paper on Orchard Culture. I am no Professor of Orchard Culture, although I have had some experience in that line for the last thirty years. I have learned many things in that time, and the more I learn the less I know. My remarks on this subject will be brief.

The first thing, then, in order is location; this cannot always be to our liking, because the orchard must be in proximity to the dwelling; but when a northern exposure can be obtained it is desirable, for the following reasons: To avoid the sun in winter, and early frosts in the fall, and late frost in spring. You may ask, how is this? When we have an early frost in the fall, the wind is invariably in the north, and blows the frost over on southern slopes where it is still. For this reason frost settles on low grounds first.

Another advantage is, the buds do not start so soon in spring.

The same rule holds good for spring frosts.

Preparation of Grounds.—It is presumed, of course, that you find the ground in good tilth; if not, better defer the setting till it is. I used to dig borders, or holes, but now I dig them as large as my field, by plowing and trench plowing. If the ground should naturally be low, it would be wise to back furrow and ridge up before planting.

The Trees.—Purchase your trees of the nearest reliable nurseryman.

I am not in favor of planting trees as small as some of you gentlemen, for the reason they are soon lost sight of. They are too often grown on the 5 to 7 foot system, without regard to body. But I shall have to stop here, or I shall be looked at sharply. But I will remark here that we have got the price so low that no nurseryman can grow good honest trees, and live. I prefer trees three and four years old. Avoid trees that have forks or crotches, for they will be liable to split in after years.

Distance to Plant.—This will vary somewhat in the habits of the trees, but, promiscuously, 24 to 30 feet.

Number of Varieties.—How many of us have made sad mistakes endeavoring to obtain the greatest number of varieties. I, myself, have fifty comparatively worthless varieties. Twenty is about the number that is required.

Of course you will have to consult your market whether you will have the most of summer, fall, or winter. Plant your trees two to four inches deeper than they stood in the nursery. Pack the soil firmly, be careful not to have any vacancies about the roots, stake and mulch. Drive your stake eight inches from the tree, on the southwest side; make a band of hay, or otherwise; put your band around your tree, then put the ends together and twist hard; open the ends and tie around the stake.

After Treatment.—Thumb and finger pruning looks well on paper, but is detestable in practice. Don't plant your orchard until you can fence it.

Cultivate any hoed crop for the first eight or ten years, then seed to clear clover. In process of time the blue grass will run the clover out, then it will have to be plowed again.

The question is often asked, in case of failure, or otherwise: What is your soil or your subsoil? I am thoroughly a climatologist. When the climate is right, then the soil is right also. Not but what soil has much to do, yes, very much. But we lay too much stress on soil. This year you notice the climate is all right and an abundant crop—nothing said about what is your soil or subsoil.

The greatest vicissitude which our fruit has to pass through is climate. And that is in the spring, about blooming time; late frosts, cold lake winds, rains when in bloom, rains followed by hot sun which scald the bloom.

There are many points that I have not touched which will be followed up by those that report upon the same subject.

If I have provoked you to jealousy, I have accomplished my end.

WHITAKER'S REPORT.

B. WHITAKER (of Warsaw) sent in the following report on Orchard Culture, which was read by the Secretary:

ORCHARD CULTURE.

The apple, our leading fruit, is among fruits what corn is among the cereal products.

It seems designed in nature as the standard upon which to rely when the more precarious fruits fail, or for want of adaptation fail to supply the demand.

The apple is wonderfully adapted to extremes of climate. The ease and simplicity of its production, and its healthiness in all conditions of life, as well as the many uses and ways it can be transformed into in its dried or pressed state, besides the susceptibility of having it fresh the year round, can but increase our admiration of this most inestimable gift of nature.

Its antiquity is traced to the Garden of Eden, and we hear of it among the nations from time to time, but such size, flavor and variety as we now can produce probably never were attained. Such apples as our Early Harvest, Red Astrachan, Sweet Bough, Maiden's Blush, Rambo, Benoni, Snow, Hawley, Fall Pippins, Summer Queen, etc., with the captivating winter varieties, such as the Baldwin, Penn, Red Streak, Talpehoching, Northern Spy, Pryor's Red, Rhode Island Greenings, Ben Davis, Wine Sap, Dominie, Hubbardson's None-Such, Smith Cider, Willow Twig; these, and others, in their perfection, are sufficient, it would seem, to satisfy the ambition of the most fastidious amateur.

If such results in the development of good apples have been attained with the hap-hazard culture, and from stocks from degenerate seed promiscuously taken from immature and refuse apples, there certainly is in store an opening for a still higher development.

Most of the old orchards in this section were planted when a multitude of cares incident to providing new homes taxed the time and means of nearly all. Yet these old orchards are paying good interest, besides gladdening the hearts of many with the annual yield of the healthest luxury for family use which the earth yields.

Within a few years past, and up to the present time, the incentive to planting out new orchards has been more than usually active; and, strange as it may seem to the people east and south of us, there are about three-fifths of these young orchards of the Ben Davis. The hardiness of

this tree, its early bearing and keeping, make it the most sure and profitable. Those unacquainted with the Ben Davis grown near the river here would naturally criticise the great preponderance of this apple as a purely mercenary object, but such is not the case. The Ben Davis, instead of being a second or third class apple, is in fact a tolerably good apple in its prime, late in the spring. It is not intended to class its flavor with the Spitzenberg, Jonathan, Pryor's Red, etc., but in itself is an apple that will commend itself among kings and millionaires when the others are out of season and gone.

The condition of orchards within our range of observation is *good*, *middling*, and in some cases *very indifferent*. The severity of the long protracted cold of 1872–3 variously injured many trees; the consequence has been trees in nearly all orchards more or less affected. The preceding winter was very dry, which condition lasted through the winter, the ground continually absorbing from the roots; the result was, nearly all roots not protected by sod were killed near the surface. This gives us a solution to injury of such trees as have their roots nearest the surface, as the Wine Sap, for one. From these statements it can be inferred when and how to trace the various conditions of trees.

In relation to orchard culture proper, it may be alleged that with good stocks, and properly planted, with vigilant cultivation, the soil being good, that the trees will succeed; but we have two insects, in particular, that need watching, and must be watched or the labor will be in vain. But first, with regard to the flat-headed borer, a little policy or engineering is assential; that is: in setting the trees, to lean them near 15° to the southwest; in three years they will stand about right. If not so set, then the borer, ever ready for an opportunity, preys upon the tree. When the bark is once killed, the tree is ruined. The other borer, Saperda, works at the collar of the tree, and occupies his place a part of three years. This borer is more under the control of the orchardist than any other known insect. Vigilant inspection of the trees *twice a year* will save the trees being bored and honeycombed near the roots.

On the subject of trimming, one says don't trim at all; another says trim every year liberally. Of course discretion must be used. Common sense naturally points to some trimming; how much, when and how are left to the judgment of the operator. Our experiences are to avoid taking off large limbs, and so far as smaller branches interfere, to trim with much care. As to the time best to do this, the following experiment is given: Trees trimmed in February and March, 1876, dried around the cut, bark disengaged more or less. Those trimmed in April bled, blackening the surface of the limbs. Those in May 15th did not bleed. Those in June 10th and June 17th did not bleed, nor the bark disengage from the cut. All commenced healing about the 10th of June, the time, or nearly so, of the development of the terminal bud.

Twig blight has been more or less observed for some years past. But last year it was very common, and mostly confined to the Janet. It was in all orchards more or less. Some pretended to make themselves believe it was caused by an insect; but the writer examined it night and

day, and hesitates not to say that insects had nothing to do with it. We must look to mycroscopic organisms for the cause. This question of blight on various trees is vailed in such mystery that nothing short of professional examination will reach the solution of its complex causes. The Willow Twig blighted up the large branches to the body of the tree. So with Tolman's Sweet. Here was a different cause. Probably the roots, affected three years ago, had something to do with the Willow Twig.

Low-headed trees, so far as inquiry has extended, have not given any better yields of fruit than high-headed. The trees may be in a little better condition, as most low-headed trees are more generally seeded down and have the advantages of sod. Twig blight on low-headed show no exemption. Protection by timber belts, especially for peach orchards, is desirable in securing against spring frosts.

The present mode of propagating stocks from degenerate seeds, taken promiscuously from all kinds of apples, ought to be abandoned. If we could unite on selecting seeds from select apples, the foundation will be laid for a higher development of this noble fruit. Some have tried double working on the stock, but we still have the roots of a degenerate seed. If we plant degenerate seed of cereal grains, we know the result. If we want to improve animals, we know the highest strain of blood is sought. Is not the same principle true in vegetable physiology?

DISCUSSION ON THE REPORTS.

Mr. Wier—As you all know, I have held the view that nine-tenths of all the pruning done is injurious. Every year more and more convinces me of the correctness of this principle. I have never pruned my trees since they were planted, and I have no occasion to complain of my success. I see no orchards in better condition than mine. The trees are healthy, and the crop good. I hold that, when you commence cutting your trees, you weaken their vitality, and invite disease and early death into your orchard. How often we have seen an orchard almost ruined by injudicious pruning. It would have been far better off if it had received no pruning. And the question of "low heads" or "high heads" is a simple one.

I say, low heads every time. Let the trees branch out within a foot of the ground. You will have a bearing tree sooner, and more fruit when it does bear.

Mr. Minkler said trees in the orchard should be set three or four inches deeper than they stood in the nursery. If not, the ground will settle, and leave the roots not sufficiently covered and firmly set in the soil.

The Hon. J. W. Robison (of Tazewell county) said that there was another advantage in deep planting—that is, the trees not only stand

upright and firmly in the ground, but they will not send up so many suckers from the base of the tree. This question of apple-orcharding has come to be a great question. The facilities for transportation have put a different phase on the business, and it becomes those who contemplate planting orchards to consider, not so much the varieties that are now in demand, but what varieties are likely to be in demand ten years hence, when the trees now planting come into bearing. At present we are satisfied with a *red* apple, if its quality is not so good. But the time is coming when quality in our fruits will be more considered than now. The scope of country which is capable of producing apples is yearly extending, and that region that can produce the finest and best apples will by-and-by rule the markets. We are going to come into competition with East and West. More apples will be raised than can be used in the markets. We must plant the kinds that will successfully compete with the world. We must study the markets that we propose to supply. We need a different kind of an apple to ship South than we do to go North. The large red Romanite is a kind of apple that sells well in the South. It is not so good for the Northern markets as some other varieties. A large red apple is the apple for the Southern market. Men are "children of larger growth," and they like red things when it comes to apples. And the South is going to be our permanent market for apples. We can get the most money out of early apples, no doubt, by shipping North; but the markets for our winter varieties are going to be more and more toward the South; and, in planting, this fact should be recognized. The Ben Davis is an apple that suits this market. No apple is better suited to the wants of the South than the Ben Davis. The Southern market is regulated by the looks of the apple, and the Ben Davis looks well, although not so good in quality as some others. The Baldwin is another very acceptable apple in this market. The Negro population take a great portion of the apples shipped South, and they buy by the eye. If an apple looks well, it is well. They do not know apples by their names. If the apple proves really good, they will eat it all; if it is not good, they throw it away, and buy again. They "pay their money and take their choice."

Orchards are now being extensively planted in Nebraska, and in Minnesota, and in all this Northwest, so that we must look to other than the Chicago market to take our apples. We must look to the distant Southern markets, and we must plant varieties that will keep, and that will bear long transportation. The South cannot grow apples success-

fully, and it is quite plain that in this direction we are to find an outlet for our immense crops in the future, and we are wise if we plant with reference to it. The recommendation given in the report, to set young trees in the orchard leaning to the southwest, meets with my approbation. I find that great injury is done to trees by the hot afternoon sun and the winds from the southwest. If the trees are set straight, the southwest winds blow them over, and expose the body of the tree to the burning sun. They are thus damaged, which damage invites the flat-headed apple-tree borer to come and make its home in the damaged bark of the tree, and so complete the destruction so well begun. It is my experience that planting in the manner described, leaning the trees to the southwest, is an excellent plan. In regard to this mooted question of pruning or no pruning, I must say I can't grow good fruit without pruning, and I never saw any man but our friend Wier who could do it.

Mr. Gaston (of Lacon) said: The apple to plant is a large apple, a red apple, and a good apple; and I must say that all these qualities you have in the Stark apple. You can ship them South, or you can ship them North, East, or West, or you can keep them at home; they are in demand everywhere. It is an apple that fills the bill. It has been before the country for a number of years. Many of you have tried it. You promised to report upon it; you have not done it. Let us hear from you; we expect a report from this State Horticultural Society.

Prof. McAfee (of Freeport) said that he wanted to enter his protest against the two extremes of "farming too little" and "farming too much." I am not in favor of using the saw and ax in a slashing manner in the orchard. There is a great deal of injudicious work done in pruning our apple trees; but it is necessary to do some pruning. Mr. Wier says, "prune not at all." This is going to the other extreme. There are conditions when pruning must be done, or the trees will suffer a greater injury. It happens sometimes that trees stand to the northeast, having been driven over by the southwest winds. The trees are too large to be staked and straightened by force, and there is no way to straighten the tree but by pruning off on the northeast side, and heading in until you have the proper balance; and in this way you can literally "put a head on" your trees that is "level." There are particular varieties of apples that need a little pruning and attention to keep them in shape. I fully appreciate Mr. Wier's protest against mutilating the orchard, as it is sometimes done; but I hope no one here will go to the other extreme, and practice with the "no-pruners." Pruning is a dwarfing process;

which dwarfing process is favorable to hardiness in this climate, especially with evergreens. Now, I have proved in the State of Iowa that evergreens not generally considered hardy are made so by severe pruning, and I am sure that evergreens that are considered tender and difficult to grow in Northern Illinois and in Iowa become hardy by pruning. I have tested and proved this at the Iowa Industrial University. There is something in the pruning that tends to dwarf and make the tree hardy.

Mr. Minkler—Our heavy winds usually come after heavy rains, which soften the ground, and the trees are blown over easily; hence the necessity of making this provision against the danger, of setting the trees leaning to the southwest.

Mr. Hale (of Galesburg) denied that the tendency "to prune" was "to dwarf." He said the tendency was the reverse—that is, to increase the growth. The man who commences to prune must keep at it. Prune some, and then you must prune more. You cannot stop when you have once commenced. Cut off one limb and two or more shoots will come in its place; and it will not be many years before you will question,

> Hardly, sure, could the tree be worse
> If it had never been pruned at all.

I have been an amateur horticulturist for thirty years, and I have reached this conclusion: that much injury has been done by reckless pruning. The true plan is, prune as little as possible. Prune when you must, to keep the tree in shape and properly balanced, and "whatsoever more than this you do is evil." If you find two limbs growing where one ought to grow, cut it out quickly, and then put your knife in your pocket.

Prof. McAfee—I would like to ask Mr. Hale what he would do if he wanted two limbs where one grows?

Mr. Hale—I do not know that there is ever a case where such a want is present. But, if such a case can be imagined, I will say I would prune to thicken up the head. That is the tendency of pruning.

Mr. Kinney—Mr. McAfee's teaching, it seems to me, is very different from what we are taught in the books. He says that the pruning of tender varieties of trees hardens them. I have always supposed that pruning exhausted the tree.

Prof. McAfee—When you plant out 100 Scotch pine trees you are liable, in this part of the State and in Iowa, to lose a large part of them. This is my experience, when planted in the ordinary way. I planted, in 1875, a certain number of Scotch pines for trial, unpruned; and I planted out an equal number at the same time, and by the same persons,

which were pruned severely. I cut off every bud; and now for the result. Every one of those unpruned died; every one pruned lived. This was one experiment. I have made other similar experiments with the larch and other varieties, and with similar results. Now, what do I mean by tender? I mean failing to grow. I do not mean simply that they can not stand the cold. Trees that do well in Wisconsin are not hardy to Northern Illinois. They cannot stand the drouth, it may be. They fail to grow. The philosophy of it is, that the evaporation is not so great, and there are other causes. In the far North all the circumstances favor a dwarfish habit, which tends to harden. Dwarf does not mean necessarily little. A tree which is not so open in growth as another is more dwarf than another. A tree that is thickened up is what I call dwarfed. The shortening in and making more stocky is a dwarfing process. Without pruning you have extension. It is by pruning that you get compactness and a well-balanced tree.

Mr. Wier—I have heard before that a tree would not bear fruit if it was out of balance. I would cut back in planting, because the roots are cut; but I do not call that pruning. I do not think any man here will will say that is pruning. In my orchard of 12,000 trees I do not recollect of seeing one that leans to the northeast. The reason is, they were, at planting, well cut back. All this talk about "opening up the head of a tree" is bosh. The more you open up the more you may, and the result is a thickening up of the head of the tree. Take a tree that has been pruned in the orthodox fashion, supposing it to be twenty years old, you will find the fruit twenty feet from you; while in my orchard of low heads and unpruned trees you can reach the fruit. Mr. Gaston and Mr. Galusha have seen my orchard, and they know what I say is true. It is my experience that trees unpruned bear earlier than trees pruned after the common fashion. I cultivate my trees as I would cultivate corn.

Mr. Minkler—How far do you plant your trees apart?

Mr. Wier—From fifteen to forty feet, according to varieties. Summer Pearmain and Wagener I plant fifteen feet apart, and Early Harvest twenty feet apart.

Mr. Bryant, Sr.—The motto of our society is, "An Art that doth mend Nature."

Mr. Wier disputes that. I understand that he says that nature can not be mended. There is one point to which I call attention in regard to pruning trees one, two and three years old. Mr. Wier says there are not too many branches on this tree [holding in his hand a small nursery

tree]. I say there are too many. Now, if you wish to save pruning, you must trim this tree to three branches. If I were going to set this tree, I would cut off all the branches but three, and then you will not need to trim much after that. Another thing: This idea about having trees one hundred years old is all moonshine. I have trees forty years old, and eight feet in the girth, and they are still growing. They are not worth anything but for cordwood. To get what few apples they bear would require a forty-foot ladder. You cannot depend upon an orchard for more than twenty or twenty-five years. It is better to cut down the old trees and plant new.

Mr. Tull (of Hancock county) said that he once pruned to excess. I have been in the business of fruit culture for forty years, and my testimony now is, the less pruning the better. I set my first trees in this State in 1838, and some of these trees are still standing and bearing fruit. There is another matter that has not been touched upon, and that is the different varieties adapted to the different soils. I have an apple called the Alexander. Planted on rich soil, it is not worth anything, because it rots so; but, planted upon poor soil, it is just as free from rot as any apple. Take the Rappahannock planted on prairie soil, and it does not do well; but on clay soil it does extremely well. In my early experience, the Red June was one of the most profitable apples, but of late years it has proved worthless. As to the time of pruning, I say the middle of June is the best time. If you prune at all, prune then. The wounds soon heal over, and the least harm is done. I have one hundred and fifty varieties of apples in my orchard. Many of them worthless. We made a great mistake in setting so many worthless varieties. The profitable sort are few. I used to recommend close setting, but now I would give more room. I recommend cultivation till the orchard is ten years old, then sow to clover and pasture with hogs. I know an orchard thirty-five years old, cultivated every year, and still in good condition.

The subject of Pear Orchards and Pear Blight was discussed, but no valuable information came out of the debate.

The subject of Light and Air as Essential in Protecting Fruit, and giving to the apple its ruddy tints, was briefly discussed, and provoked one Mr. Hayes to say that, if he was buying apples to eat, he would not take apples that had red cheeks, if he could help it, for the reason that those which grow "unblushed and unseen" on the inside of the tree, in the shade, were better; and who that has drunk "old wine straightway desires the new"?

DELEGATES FROM OTHER SOCIETIES.

Prof. H. H. McAfee, Vice-Pres't of the Iowa State Horticultural Society, was present as a delegate from that Society. Also, Isaac Baldwin, of Jacksonville, announced himself as a delegate from the Jacksonville Horticultural Society.

Adjourned.

WEDNESDAY AFTERNOON.

President Hammond called the meeting to order at two o'clock.

REPORTS ON VEGETABLE GARDENING.

E. C. Hatheway (of Ottawa) sent in the following excellent report on Vegetable Gardening, which was read by H. D. Emery:

To my Fellow Members of the State Horticultural Society:

It has become my duty again to add my humble mite to the mass of horticultural learning and information which has been elaborated from the experiences of the past year, and although it may be but a trifle, it certainly can be taken for the results of actual experience, divested of all theory; and experience, hard-earned and trusty, is what our people need to-day; for the lightning trains, upon the steel bands that now cross and recross each other at close intervals all over our country, are bringing the special products of one locality, at cheap rates, into close competition with those of other localities, even at considerable distances.

The subjects of soils, and their fitness for special products, have not received the attention of gardeners to that extent which their importance deserve.

If the gardener has a variety of soils, then he may be able to cultivate a long list of vegetables successfully; but if, as in the majority of cases, he has but a *small patch*, consisting of one variety of soil, then it becomes him to consider what will do best upon that particular kind of soil. For instance, the soil of my home place consists of an alluvial drift, very rich, lying high above the Illinois river. It is sufficiently sandy to be very friable. I devote about one acre of it annually to radish, which is sown as soon as the frost is out in the spring. I never realize less than from $500 to $800 from it each year; while a number of gardeners a half mile distant from me, on flat and equally as rich land, with a slight admixture of clay, not naturally and so situated that it would be difficult to tile drain it, jealous of my success, plant each year a lot of radish, but if they have any crop at all, so worthless that it brings them little or nothing in market; and assure them as I may to the contrary, yet they still believe that I have some secret method of preparing the seed

or the land which I will not communicate to them—they not thinking or believing for a moment that it is simply the difference in the soil that makes the difference in the crop.

On the other hand, while I have failed in every instance to grow celery on my ground, they raise it without much difficulty. So, also, with lettuce. We can raise it equally well in early spring, but upon the advent of a few hot days mine shoots at once to seed; but they can extend their season long after I am obliged to cease cutting.

With many other crops, we can each be assured of moderate success. Yet, invariably that success is more or less marked in favor of one or the other each year. While they grow larger crops of the (*on their soil*) almost worthless Red Burmuda sweet potato, the same variety (though not half the quantity) grown on my soil is of very good quality. The Yellow Nansemond is a failure with them, growing nothing but long roots, but with me the quantity as well as the quality is as satisfactory as any part of the State produces.

Parsnips with them are an exceeding fine crop, but with me they do not pay well. Yet I can grow the carrot to perfection, while they get a poor, if any crop at all. Late cabbage is their forte, early cabbage mine. Early turnips and tomatoes, egg plants and peppers, are specialties with me, while very late tomatoes and potatoes seem to be more successful with them.

Thus we see that it requires the closest attention to the matter as to where we plant each variety, as well as each class of vegetables; and nothing but this close attention will assure success, and place money in the pocket of the gardener.

At the present time the business of seed-growing has become so extensive, and competition among seedmen so great, that none but the best seed need be planted, as they can now be obtained at prices that but a few years ago were double, and in instances treble, what they are at present.

None need now to depend on the old-time "store seeds"—*ten cents a paper, three seeds, or thereabouts, in each*, warranted (not) to grow—as we have a great number of firms, even here in our own State, who send out seeds of undoubted purity and of good quality, by the ounce or pound, at prices which are within the means of the poorest.

This growth of the seed-producing and distributing business, by mail and otherwise, has had its effect in stimulating the farmer also to no longer neglect his vegetable garden, but to make it a part and parcel of his daily attention, enabling him, by adding its surplus to the butter and egg account, to make it largely pay his bill for groceries, etc., at the store. It has also not only served in a great measure to make his table more varied with healthy food, and *ever-changing variety*, but has served in a great measure to do away with the everlasting hog and hominy, which only produce fatty secretions to create animal heat; but, under the vegetable regime, he is furnished food for the brain as well (at least, so scientists of to-day tell us), and if there is a class of beings on earth at the present time who need more brain or brain action, it certainly is the one that

is obliged to till the soil for his sustenance, for every year makes more plainly manifest the fact that "*cultivating with brains*" pays.

The past season has been a peculiar one. The winter previous being an open one, with hardly any frost, added to which was a continuously wet spring, the consequence was, the soil was in a sodden, lifeless condition, which rendered the sowing of seeds very difficult, and their germination very uncertain.

Then the drying winds and hot sun, when they did appear, baked the ground into lumps, rendering it very difficult to properly cultivate the growing crops. Therefore there were more vacancies than usual in the rows, and the plants also were not uniform in their growth, and this peculiarity existed all summer and season through.

In giving a list of vegetables, I give those only which have done best with me. I wish it understood, however, that I have and do cultivate, for my own satisfaction, quite all of the newer varieties, but only adopt them as I become satisfied that they are superior to the older varieties.

Beans, Bush.—I plant almost the whole crop with Black Seeded Wax, as their unusual excellence of quality, and the color of the pod, causes them to sell at larger prices than any other; besides which, they are very productive and quite early. I hope ere long to see the White Seeded Wax as productive as the Black, thereby doing away with the objectionable color of the seed of the latter variety. For extremely early I prefer a few of the Early Fejee, and for pickling late, the Refugee.

Pole Beans.—The large White Lima is best for table, but for marketing for profit the Small Lima is best. Next to that, the Dutch Case Knife.

Beets.—For hot beds to transplant, and for first early out of doors, Black Egyptian is best; but for main early crop I still prefer the old Bassano, to follow with Deering's or Early Blood Turnip rooted. For winter, the Long Smooth Red is best with me.

Broccoli.—White Cape does fairly.

Cabbage.—I find nothing so profitable for early as Winningstadt, as it begins to form its head almost as soon as any other, and can be used (as the head is solid from the start) about as soon as any. This variety is followed by Fottler's, set at same time. For late there is nothing better than Premium Flat Dutch.

Carrots.—For marketing, bunched, the Early Horn is best. Long Orange for general crop. For this crop deep plowing is very necessary, and *beware* of long or not thoroughly rotted manure, if you wish smooth roots. But you can put on as much *old* manure as you think necessary; then, just to see how it will work, put on as much more. The same remarks will apply to parsnips as well.

Cauliflower will do well if you have moist ground or have conveniences for flowing any ground at intervals. But if these conditions do not exist, *don't plant it*, for you will probably be disappointed. For early, perhaps Early Paris is best; but for late, plant Lenormand's Short Stemmed. *Culture*—Plant in shallow trenches, and as the plants grow

throw the earth to them with plow, and so continue until your patch is ridged up to resemble sweet potato ridges. Between these ridges the water can be flowed, or for that matter it will not hurt the crop to let the water stand there, provided it is not higher than the roots of the plants.

Celery I have to depend upon other growers for, as it does not pay me for time and trouble.

Cucumbers.—The past season has not been a successful one, so far as the *cucurbitacæ* family is concerned. The alternating cold and hot days, with excessive moisture, seemed to so debilitate them, that they succumbed readily to rust and mildew, which attacked them, and which it seemed there was no remedy for, and so most of them gave up the ghost. I have but little trouble with the striped beetle, as I keep the vines thoroughly dusted with land plaster, from the first appearance of the seed leaf until the fruit has well commenced to form. The Early White Spine cucumber is best for forcing and garden, and the Improved Long Green for late pickles.

Sweet Corn.—Early Minnesota, followed by Moore's Concord, give me more satisfaction than any I have ever tried for early. While the old Stowell's Evergreen as yet I think has never been excelled as a variety to close up the season with.

Egg Plants.—New York Improved, for market purposes, is best of all, on account of size and productiveness; but if one wishes something a little nicer, then plant Black Pekin.

Lettuce.—For hot-beds White-Seeded Tennis Ball is best, yet Hanson is good; but for out-doors Hanson stands at the head; while for summer Brown India will stand heat of sun longest, without running to seed.

Melons for garden culture, for market, don't pay, but for field culture and for farms they are a profitable crop. Would recommend Alton Nutmeg, Improved Cantelope, and Green Citron; and for Water-Melons, Early Phinney, Mountain Sweet, and Mountain Sprout, for market, and Improved Orange for family use, and Citron-Melon for preserves.

Okra, or Gumbo.—If you want something nice for soups, plant the Dwarf Green Okra. It hardly pays North, for market, as but few know its use, therefore there is but little sale for it.

Onions.—Growing this esculent from seed, for marketing the same year, I leave for other cultivators. I only market them bunched in a green state, the sets for which I grow in the following manner: Early in spring I scatter the seed of Yellow Danvers and White Portugal very thickly in shallow drills, covering lightly with finely pulverized soil, rolling it down hard. They soon come up and begin to crowd each other. As soon as they are about an eighth of an inch in diameter they are raked out upon the surface of the ground and allowed to dry out. They are then spread evenly and thinly upon a barn or loft floor, to cure. After which they are stored away for next spring's planting. In planting they are set in drills about eight inches apart, and two inches apart in the row. When they soon are large enough to bunch for market.

Parsnips.—Hollow Crown is certainly best for all soils.

Parsley.—Moss Curled does better with me than any other variety, and, by the way, is not a bad plant for the flower border, or for edging walks. If any one asks the name of it, tell them it is *Apium Petroselinum*, and it will be all right. They will think it elegant.

Peas.—Plant *deep*, with almost any variety, and success will follow. My favorites are, for first early, Philadelphia Extra Early; for second, McLean's Little Gem and Advancer; for late, Blue Imperial and Black-Eyed Marrowfat.

Peppers.—Sweet Mountain and Orange Colorado for pickles, and Cayenne and Long Red for sauces and culinary purposes. Plant in rows eight inches apart, with rows far enough apart to work with horse hoe. Hen dung is the best fertilizer for this crop.

Potatoes.—I prefer Early and Late Rose, and Snowflake. Let discussion bring out the merits of the other varieties. The ones I name are the only ones that haven't rotted in this locality, that I know of.

Squash.—For early, I know of none better than Yellow Summer Crook-neck; for winter, Hubbard, American Turban, Butman and Boston Marrow succeed best.

Radish.—French Breakfast for forcing, and Rose Olive-shaped for first early; Scarlet Turnip, second early; Covent Garden Long, Short-Top, third; White Turnip Radish for summer, California Mammoth for winter.

I *must* say that in all my gardening operations I have uniformily made *more* money from radish than any other vegetable I have ever raised. My method is this: I cover the ground in fall or early winter with about two inches of old and very finely pulverized manure. This is shollow-plowed in spring, as soon as frost will admit. I then commence drilling-in the seed in rows eight inches apart. As soon as the seed leaf shows above ground, the whole surface is then raked over with steel rakes. The drill is then set at work, depositing a row of early beets between each row of radish. As soon as the radish are large enough they are trimmed out two inches apart, and as soon as the beets make their appearance all are carefully hoed.

They get no more cultivation until the radish is all pulled, when the ground is thoroughly hoed with steel-pronged hoes, between the rows of beets, which are thinned to three inches apart at the same time. The beets are then marketed as soon as they will do to bunch. The ground is then deeply plowed and a crop of quickly-growing cabbage, say *Fotler*, planted thereon, which will generally make good heads before the ground freezes in the fall. I can get from $500 to $800 from an acre of ground in this way, and the beets and cabbage pay more than the expenses of the whole crop.

Tomatoes.—There has never been a time since the introduction of the Trophy that I would exchange it for any other variety. I have tried all, and this comes nearest to perfection with me. I like, for first early, the Excelsior very well, on account of its smoothness and solidity, but as soon as Trophy comes in in quantity the Excelsior is abandoned.

I still follow the plan of deep-setting the vine, and have never had occasion to change my mind in relation to it. I get earlier tomatoes by letting the vines lie close to the ground with a little brush under them, but for late ones prefer to tie to stakes.

Turnips.—For early market, have never yet found anything as good as Red-top Strap-leaf, sowed same time as radish.

The foregoing list comprises those varieties of vegetables which I am best acquainted with, and which I am most successful with.

In my experience it is not so much the area of land the gardener cultivates that makes him his profits, as the care which he bestows upon it.

Thorough culture, plenty of manure properly applied, care in the selection of soils, and the seed that he plants therein, are the principal points he must consider. And through them, and them only, may he expect to line his pockets with profits, if he line them at all.

Respectfully submitted,

E. C. HATHEWAY.

Mr. H. K. VICKROY (of Normal) read the following paper on the same subject:

Mr. President, Ladies and Gentlemen:

I have little, if anything, new to report, and especially to such an audience as is before me. The different modes of treating or handling plants for the market and kitchen garden have been pretty thoroughly written up and discussed in previous meetings, and published in the Society's Transactions, so I feel at a loss to know just what to say that would be interesting or of value. I think it is generally admitted that a good garden is a household necessity. Those deprived of a good garden are to be pitied. It seems to me that this luxury is within the reach of every one who owns a square rod of vacant ground.

Vegetables of nearly all varieties have been plentiful, and of fair to good quality, and in consequence prices have been very low. Late potatoes have been pretty scarce, owing, I think, in a great measure, to the very wet season. The ground was so wet they could not be cultivated, and there was not nearly so many planted as last season. Last season they were so plentiful they could hardly be given away. I have observed for a number of years where a vegetable, or anything else raised in the garden or upon the farm, was in excess one season, that the following year it would be in the other extreme. So I would advise those growing vegetables for the market, to raise about the same quantity each season, until they are satisfied that variety will not pay, taking a series of years together.

In order to make the most of the garden for supplying the market and our own tables with all the vegetables of the season, it requires *plenty* of *good* manure, *good* seeds, purchased from RELIABLE seedsmen, or saved from the best specimens of our own growing; and plant none but the best and strongest plants, if it costs you twice as much to grow or purchase them. I would not plant a poor plant in the garden, or anywhere

else, if I could possibly get a good one; the best, in this case, as in all others, is the cheapest. Here is where a great many fail in having a good garden.

No one need expect to succeed in market gardening unless he has some knowledge, and the more the better, of the business, and is not afraid of hard labor and a good deal of dirty work, and plenty of good cheer, for the market gardener well knows it is not all sunshine. It also requires a great deal of skill to properly market your produce to obtain the best results. A man may be capable of producing large and excellent crops, but may utterly fail in marketing them. They must be put up in nice, *clean* bunches, or packages, as the case may require, of even quality. I find I can get as much, or more, after the poorer class is thrown out, as I can for the whole, and they meet with more ready sale. Everything must be put in the best shape to catch the eye of the buyer. He should be well posted in the markets all over the country, so as to know just what to ask for his produce. You will perceive the object of the market gardener, as well as in most all other callings, is to make money. No one can make me believe that the gardener toils early and late, through mud and cold, merely for the love of so doing. Lettuce, radishes, rhubarb and asparagus are the first vegetables we market. The lettuce and radishes are generally grown between the early cabbage, as they are out of the way before interfering with the cabbage. Hanson, Early Curled Simpson and Boston Curled are the main varieties grown here, and are giving good satisfaction. Of radishes, there is a variety raised by some of the gardeners around Bloomington that are far superior to anything I have seen—mild and tender in the hottest part of the season. I don't know the name of them, and if they do, they will not tell for love or money. Long Scarlet Short-top, Scarlet and White Turnip are very good. Asparagus is becoming very plentiful in nearly all the markets, but with plenty of manure and judicious marketing the returns are satisfactory. We ship most of ours to Chicago. We cut at the surface of the ground, taking only the green, and tie in bunches about three inches in diameter and from ten to twelve inches long, with white twine at each end, and with a strip of white cotton cloth half an inch wide, with my name, around the middle, and pack in half and bushel boxes.

A limited amount of rhubarb, for home market, pays very well. We cover ours in the fall with a foot of coarse horse manure, and allow it to grow up through it in the spring. In this way, it is very early—from eight to ten days earlier than that not covered—and it is very tender and nice.

Early beets we start in the hot-house or hot-beds, in boxes about three inches deep, filling the boxes level full with dirt or compost, sifted through a quarter-inch sieve, and pressed down pretty firmly, sowing the seeds in shallow drills about half an inch apart, and three inches between drills, covering lightly and pressing the dirt again. After the plants have come up, if too thick, we thin to one inch apart in the row. We leave them in the boxes until we want to plant in the field, by changing the boxes to cold frames a week or two before planting, to harden them. It does not require as much work to transplant into the garden as does the

first weeding; then you can go to work in a day or two with wheel-hoes, and there is very little, if any, hand weeding required. In this way, you have a perfect stand from three to four inches apart in the row. It is very difficult to get a good even stand when the seed is sown in the open ground. But I think the greatest gain in growing them in this way is, that you have them all marketed by the time those started in the open ground are ready. I have planted my beets in this way for the past two seasons with excellent results. I use the Egyptian variety. For very early, I think they are the best.

Early cabbage rotted pretty badly, but there was plenty to supply the demand. The standard varieties with us are Jersey Wakefield, Early Wyman and Winningstadt. I have tried Henderson's Early Summer this season, and it has given very good satisfaction. It is a little later and a little larger than the Jersey Wakefield, and the disseminator, Peter Henderson, claims that it rarely or never bursts open when it is ripe. Late cabbage were pretty scarce, owing to the little black beetle eating the plants in the seed bed. The standard variety here is the Flat Dutch.

Our manner of growing early tomatoes is to plant the seeds in shallow boxes in the hot-house or beds about the middle of February; and when they show the third leaf, transplant into other boxes, giving them more room; and when they crowd again, we transplant. We generally transplant about three times. In the intervals of transplanting, we draw a knife between the rows to root-prune them. Those we intend for market we transplant into shallow boxes three inches apart each way. These boxes we leave at the groceries and other places, and the plants are kept growing until they are all sold. We also transplant them into quart fruit boxes—(in making these boxes, we let the bottom down even with the sides)—putting one plant in some and four in others. These we take to market in the boxes. For our own planting, we use those with one in a box, having them very stocky and well hardened, and generally in bloom and fruit-set at the time of planting. When the ground is ready, we set the boxes into a tub, with enough water to cover them, and let them remain until soaked through, and then send them to the garden, where the contents of the box is turned out and placed in the hole, and the dirt drawn around it. In this way we can plant through the hottest part of the day, and the plants will not wilt a particle; and this is a great point, and one that should be guarded against above all others; if the plant wilts, nine cases out of ten it will drop the fruit-set and also the blossoms, and it will be ten days or more before the plant recovers. If staked, it should be done at once, and kept tied up with wool twine every fifteen inches of growth, and all the suckers and most of the laterals kept cut off. Unless they are tied up properly, better let it alone, and let them run on the ground. If you have plenty of room, so they can be planted six feet apart each way, and some brush or clean straw thrown under them, cutting off the points of the vines occasionally with a corn knife is a very good way.

I have tried two new varieties the past season—the Acme and One Hundred Days. The Acme, introduced by A. W. Livingston, Reynolds-

burg, Ohio, I think, is rightly named. It is the finest tomato I have ever seen, and I have tried a great many varieties. A good, healthy plant, prolific, fruit of medium size, large enough for any use, as smooth as nature can make, ripe all over and through at the same time, solid, but few seeds, and quality *best*. I lost my first plants of this variety, and cannot speak positively as to earliness compared with Canada Victor, but I think it is as early. Every lover of tomatoes should give this variety a trial the coming season.

The One Hundred Days is early, showing fruit buds in the hot-house four weeks from the time of planting the seed. The plant is somewhat dwarf, prolific, but the fruit is small and rough. Trophy and Canada Victor are the standards. If the Acme succeeds in the future as well as it has promised, it will stand at the head of the list. The following list of vegetables, not before mentioned, are giving good satisfaction with us:

Egg Plant—New York Improved and Black Pekin. The New York Improved being earlier, and, I think, better in every respect.

Peas.—Carter's First Crop, Tom Thumb, McLean's Little Gem, Daniel O'Rourke, Carter's Premium Gem, and Champion of England. The Carter's Premium Gem is *A No. 1* for family use; not very prolific with me, but the *finest* for table use of any I have seen.

Beans.—Black and White Wax for early; Small and Large Lima for late.

Sweet Corn.—Early Minnesota, Stowell's Evergreen and Burr's Improved. By planting every two weeks you can have green corn until frost. This is one of the most delicious dishes brought to the table, and is so easily and cheaply raised.

Carrots.—Early Horn and Long Orange.

Celery.—Incomparable Dwarf and Large White Solid. It is almost impossible to grow this on our soil with success.

Cucumbers.—Early White Spine and Long Green.

Musk-Melon.—Alton Nutmeg and White Japan.

Water-Melon.—Mt. Sweet, Phinney's Early and Orange.

Parsnips.—Long Smooth, or Hollow Crown.

Peppers.—Bull Nose and Sweet Spanish, for pickling.

Potatoes.—Early Rose is giving *good* satisfaction as an early and late potato. Snow Flake, Brownell's Beauty and Late Rose are promising well.

Sweet Potatoes.—Yellow Nansemond and Jersey Short are the standard varieties; Southern Queen and Red Bermuda can hardly be sold in our market. The quality of the Southern Queen is very little, if any, better than the Bermuda, but it is an excellent keeper.

Squash.—White Bush, Scollopped and Summer Crook Neck, for early; Hubbard, Marblehead and Butman, for winter.

Turnip.—Purple-top Strap-leaf, for early and late.

This concludes the list that is grown in any quantity.

Respectfully submitted,

NORMAL, ILLINOIS. H. K. VICKROY.

MARKETING VEGETABLES.

Capt. E. Hollister (of Alton) sends the Secretary the following paper, which was received too late to be read at the meeting:

From the want of proper care and skill in the preparation and packing of vegetables for market, comes much of the loss and unsatisfactory returns. I may say, nearly all the poor returns may be attributed to this cause alone. The producers or dealers in most branches of industry have their regular established rules; the object being to offer to the consumer such product in its best condition, and thus to sell it readily. Perishable articles, especially, require this attention, both as to quality and condition; and by sad experience has this truth been forced into practice. The shippers of game, poultry, eggs, butter, etc., all have their favorite modes of handling, packing, package, etc., as experience has determined. No one will doubt, then, that such perishable produce as vegetables, such as the market gardeners handle, and most early in the season, reaching into summer, must have proper care to insure its preservation in good condition.

To particularize, let us begin with the earliest, and mostly grown under glass, such as lettuce and radishes. While the season remains cool, and at the first, such may be taken from the soil at any time during the day; but later in the season, such and all other vegetables should be taken at such time as the heat from the sun shall not have caused the leaves to wilt—early in the morning proving the best time.

The remarks which I make are intended chiefly for the market gardener's shipments.

First, the heads of lettuce or bunches of radishes should be uniform in size, each package containing the same amount. Very early in the season these packages should be close, to prevent any freezing; when danger from frost is past, they should be open for ventilation, to prevent heating or fermentation.

A basket or crate holding one and a half to two bushels is convenient and economical. In larger packages, unless the distance is short, the bulk is too great, heats more easily, is liable to rougher handling, and its own weight will cause it to shrink until it becomes loose, and then it bruises and breaks easily. For long distances, much smaller packages even than the first named are desirable.

The vegetables, having been cleansed with water slightly warm, assorted, and those needing it neatly and systematically bunched, are to be thoroughly drained of the water, yet not dried so as to wilt.

The crate should be packed regularly, with moderate pressure of the hand to keep it firm, and the crate filled above the level, so that in putting on the cover a slight pressure will be necessary, and when completed it will stand a moderate degree of rough usage and yet remain full. Such packages, when open, will present an inviting appearance, be in good

condition, and find a ready market—the leaves all green and bright, in contrast with a package badly put up, where the lettuce is more or less bruised and broken, the radishes are wilted, and the leaves so bruised as to have turned black. The former is eagerly sought for, while the latter can scarcely be given away. Both these packages have cost the same, and the freight is the same; yet there is no sale for the latter. Is there any wonder at poor returns?

As the season advances, we get pie-plant, onions, beets, asparagus, peas, beans, cucumbers, cabbages, and the like, each needing its own special preparation, cleansing, bunching, etc. A volume might be written upon this subject, going into details; to particularize would make this article too long.

I will add, however, that to these and others the same general principles will hold good in gathering, packing, etc. They should be gathered before being warmed and wilted by the heat of the sun; such a condition renders them unfit for human food, and they are only fit to help discolor and give odor to the Chicago river.

Each variety should be packed separately, so that the odor of one may not be imparted to others. Perhaps no vegetables are so difficult to ship in warm weather as spinach, peas and beans. The former should not be washed before shipment, simply the yellow leaves and roots trimmed off, and then well shaken, to sift out any dust; thus prepared, it may make a twelve-hour trip by express in a barrel. Peas and beans should be thoroughly dry and cool when packed; the packages not to exceed one bushel, and smaller packages used if the trip is over twelve to fifteen hours. Asparagus may be shipped in a package containing one bushel, yet a smaller one is preferable; a one-third bushel box will pack nicely two to two and a half dozen, and may be so arranged, by uniform size and length of bunch, as to be very attractive, and thus invite purchasers.

In harvesting these various products of toil, the aim and thought of the packer should not only be how nice these things are and appear *now*, but his thoughts should run ahead, and his mind should grasp the *end*, and so should he use his skill that he may find the market in the best possible condition; not only this, but he may increase his markets, suiting the packing and package to the farther markets.

Get a live, honest man to handle your produce; keep in constant and regular communication with him; be ready for any emergency; have your packages made before you need them. A few days of warm weather often push your crop ahead; something must be done, and done quickly, then; be sure it is well done, or throw your stuff away. It will be easier to bear this loss than a probably greater by shipping out of condition in quantities too large for your markets.

Each package should be uniform for the different kinds of vegetables, neatly made, kept bright and clean, and marked plainly with stencil the quantity in each, with your own stencil. You thus make your own customers, who will deal with you if you but deal fairly with them.

DISCUSSION.

The effort to get up a discussion on the subject of the vegetable garden failed.

MR. ELWANGER (of New York) said that the apples called the Wythe and the Stark were new to him, and he would be glad to hear something about them.

MR. HAMMOND (of Warsaw), who has the apple called the Wythe, gave its history, as he had often done in our meetings before. He regarded the apple as one of great promise. The tree is very productive and hardy. The apple keeps well—say about with the Ben Davis; good quality. It is worthy of general dissemination.

MR. EDWARDS (of Mendota) said that he had fruited the Stark. It is a better apple than the Ben Davis or Willow Twig. I planted 150 trees upon the recommendation of Aldrige, and have thus far no occasion to regret my action.

MR. BRYANT, SR.—I have fruited the Stark this year for the first time. It is a better apple than the Ben Davis. It has been said that it is very productive, but such is not the case here; it is not productive in this part of the country. I have trees that were top-grafted eight and nine years ago, that have not yet fruited. The trees that fruited this year are small trees in the orchard.

PROF. STANDISH said he would give his experience with this Stark apple. Some four years ago, a gentleman came this way who praised this apple. He said it was good early in the fall, and it was good through the winter, and it was a late keeper. I fruited it this year for the first time, and I must tell you how well I succeeded, and I must tell you about my *crop*. I raised just one apple. The other day we tried it, and we found it a fair eating apple. This tree bore three years from the graft. This same gentleman who grafted my tree grafted many others in this neighborhood, and my graft is the only graft of all that he put in that grew. I do not know much about the apple, but it seems to me that there is nothing in the flavor of the apple that I should particularly recommend it above many other varieties that we have.

MR. COCHRANE said the tree was tender with him. He had had it in bearing for two or three years.

MR. ROBISON said that Dr. Warder speaks of it as hardy.

MR. WIER—I have seen the Stark in bearing from four to six years old. We call the Ben Davis productive; but the Ben Davis is not as productive as the Stark. The only trouble is that it drops its fruit.

The trees in the nursery are tender, but in the orchard the tree is hardy. We have had good chances to compare it with others. We have the Stark and the Ben Davis grafted on the same tree, and I think the Stark has produced one-third more apples than the Ben Davis.

Mr. Minkler said he had found the tree tender.

Mr. McWhorter said it received the most injury in the winter of 1872.

Mr. Cawkins (of Iowa) said that he had the Stark top-grafted, and they have not been injured with him. He hears no complaint in this direction. The tree is a very rampant grower—a little better than the Ben Davis. He had them at home larger than anything he saw here, but, after all, did not think there was anything in them to give us great encouragement. He would rather have one-fourth of a bushel of Grimes' Golden than five bushels of Stark.

REPORT ON GEOLOGY.

Prof. A. H. Worthen (of Springfield) read the following interesting paper. No discussion followed, owing to the lateness of the evening.

ORIGIN OF SOILS.

Mr. President, Ladies and Gentlemen:

I appear before you at this time, at the request of your worthy President, to say something upon the origin and formation of the soil, and its relation to the geological structure of the country; and as this theme is by no means a new one, I fear I may not be able to offer anything that will throw any additional light upon a subject on which so much has been already said and written, or to advance any theories that will be new to many in this audience.

Nevertheless, the character and treatment, as well as the origin and mode of formation of the soil, are subjects in which we are all directly interested, inasmuch as we are dependent upon its productive capacity for all the physical comforts we enjoy, and hence the consideration of this theme becomes a matter of such general interest, that even a repetition of well-known facts and observations may not be quite out of place on an occasion like the present, and before an audience composed largely of those who are directly engaged in agricultural pursuits.

Every close observer of natural phenomena will notice the sudden changes that frequently occur in the character and quality of the soil, even in our own State, where its general uniform character is proverbial, and it is both interesting and important that we should understand the causes to which such sudden changes are to be attributed, and hence we need to become acquainted with the general laws that govern the formation and distribution of the soil.

If I were asked to define in the briefest manner possible what constitutes a soil, I should reply pulverized rock, for it is now a generally recognized fact that a large portion of our soils owe their immediate origin to the rocks upon which they rest, and hence we see the intimate relation existing between the soil and the geological structure of the country.

Now, in order to learn the mineral constituents of the soil, it will be necessary for us to know what are the principal mineral ingredients that enter into the composition of the rocks; and when we examine closely the rocky masses that go to make up the outer crust of the earth, so far as they are accessible to human observation, we find them composed mainly of three simple mineral substances, to wit: sand, clay and lime; and so, when we make a chemical analysis of the soil, we find that it contains from 80 to 95 per cent. of these three minerals, the remaining portion being composed of variable quantities of organic and inorganic matter.

In studying the character of the soil in any given locality, we might first ascertain whether it had been formed from the decomposition of the strata immediately beneath, or, in other words, from the bed-rock, or from transported material that has been derived from some other region, and now covers the former so deeply as to place it beyond the decomposing influences of the atmosphere. In the latter case the soil would probably possess a quite uniform character over considerable areas, regardless of the changes that might occur in the character of the subordinate strata; while in the former, the constituents of the soil would change as we pass from one geological formation to another of a different character, as from sandstone to limestone, and from the latter to beds composed mostly of clay, as clay shales, argillites, etc.

If we examine almost any portion of the country lying south of the Ohio river, we shall find that the soil is generally derived directly from the bed-rock, and consequently changing in its character and quality with the changes that take place in the subordinate strata. In the winter of 1856 I had an opportunity of observing these facts, while traveling from Mobile to the Ohio river, through Alabama, Tennessee and Kentucky, and my attention was then first called to the intimate relation that exists between the soil and the geological formations beneath it, and I was then impressed with the conviction that the geological structure of a country determines to a great extent the avocations and wealth, and consequently the intellectual, physical and moral condition of the people. In passing up the river from Mobile to Tuscaloosa, over the outcrops of tertiary and cretaceous rocks, the opportunities for satisfactory observations from the deck of a steamer were by no means as good as could be desired; but notable changes could be seen even here, as we passed from the sandy and argillaceous beds of these formations to those more highly charged with calcareous matter. On leaving Tuscaloosa, however, by land conveyance, our course for nearly a hundred miles was upon the sandy shales and sandstones of the coal measures. The soil was sandy and poor, the surface broken and hilly, from the soft and yielding character of the

strata, and the hills were covered with a meagre growth of yellow pine and scrub oak timber. The farms consisted of the small patches of level land in the valleys of the streams, and the main products were corn, sweet potatoes, and small patches of tobacco for home consumption. Before reaching the Tennessee river, however, we struck the belt of lower carboniferous limestone that surrounds the coal field, and the change observable in the general character of the country, and the products of the soil, was quite remarkable. Here the hills were less abrupt, and the general surface more gently rolling, and originally covered with a magnificent forest of oak, ash, elm, cedar and sugar maple. The tilled land was exceedingly productive, yielding fine crops of cotton, tobacco, hemp, corn and other cereals, with all the fruits of the temperate zone in great perfection.

Passing on through Tennessee and Kentucky, similar changes were observed in crossing the various subdivisions of the Silurian and Devonian systems; those composed mainly of sand producing a thin, poor soil, and the clay shales a tenacious soil, while the limestones and calcareous shales usually gave origin to a soil of excellent quality, of which that of the famous blue-grass region of Kentucky is an example. These soils have been termed soils of immediate derivation, as distinguished from those predicated upon material that has been transported from a distance. But possibly some of my audience may inquire how or by what methods are the solid rocks transformed into fertile soils, fitted for the production of everything necessary for our subsistence, and the existence of the myriads of animals and plants that are directly dependent upon it for their being. No doubt many of you have solved this question for yourselves, as it is by one of nature's simplest processes, one that has been going on ever since the solid rock was formed, and will continue until the present order of things shall come to an end. If we could find an area of naked rock with a nearly level surface, and should observe it closely for a few years, we should witness something like the following phenomena:

After an exposure of a few years, more or less, according to the hardness of the rock, whether it was limestone, sandstone, shale or solid granite, we should observe that the action of frost and moisture upon the naked rock surface had gradually loosened and finally separated particles of the rock therefrom, the particles remaining loosely, in the form of sand or clay, upon it. Lichens and mosses would be found growing upon it, and to these would soon be added other plants and grasses; these would furnish a shelter for insects, and the latter would attract the birds, and thus a certain amount of organic matter would be added to the disintegrated mineral substances the rock afforded. Then, as this process of accumulation went on, the seeds of shrubs and finally of trees would take root upon it, and in due time the entire surface would be transformed from a naked rock into a more or less fertile soil, covered, perhaps, by a dense forest. If the rock surface was originally an uneven one, then the accumulation of soil would commence in the valleys or depressions, and gradually extend from thence until the whole was covered. The action

of frost in the disintegration of rocks has always played an important part in modifying the surface of the earth; and the wearing down of the hills and mountains, and the elevation of the valleys, through the joint action of frost and water, is one of the eternal processes of nature that must continue so long as the earth itself shall endure. The atmosphere contains carbonic acid, and the rain in passing through the air takes this up; and this acid has the power of dissolving the carbonate of lime, which enters into the composition of a large proportion of what are termed the stratified rocks, such as the various kinds of limestone, calcareous shales, etc.; and the rain water containing this gas is continually eating into the substance of these calcareous rocks, dissolving the carbonate of lime, which is thus carried away by the water, leaving only a residuum of the more refractory elements upon the surface; and hence the small amount of carbonate of lime that remains in a soil derived directly from our limestones and other calcareous formations. These highly charged waters find their way either into the ocean, where their mineral contents are precipitated to form new limestones, or descend into the depths of the earth, to reappear as mineral springs or form the highly charged mineral waters of our artesian wells.

So, you perceive, the production of the soil is through a very simple process; and if we go still farther, and inquire into the production of the rocks themselves, we should find them the result of processes equally as simple. Sand, lime and clay, either in chemical solution or mechanical disintegration, is constantly carried into the ocean by river floods and other causes, where they are deposited as sediments, and finally again hardened into rock. So sang the poet:

> "Lofty mountains, whose tops appear to shroud
> Their granite peaks deep in the vapory cloud,
> Worn by the tempest, wasted by the rains,
> Sink slowly down to fill wide ocean's plains."

Having now considered the origin of those soils derived immediately from the rocks upon which they rest, we pass to the consideration of the character and origin of the prairie soil, to which a very large proportion of the soils of this State belong. If we should sink a shaft or well down to the bed rock, anywhere about the city of Galesburg, or in almost any other prairie region in the State, we should find a variable thickness of thirty to seventy feet or more of loose material, consisting of clay, sand and gravel, containing boulders or rounded masses of rock, many of which, consisting of granite, syenite, porphyry, greenstone, etc., do not belong to any beds that are to be found in this State; but associated with this foreign material we should, perhaps, find similar boulders composed of the Silurian limestones of Northern Illinois, indicating that this mass of transported material had come from a northerly direction.

Nuggets of native copper are also found in this transported mass; and by comparing many of the boulders with the rocks occurring about Lake Superior, we should probably find that a large part of this drift material had come from a high northern latitude. This transported material covers the bed rock so deeply that atmospheric influences cannot

act directly upon it, and consequently it has little or nothing to do in determining the character of the prairie soils. Usually, the prairie soil rests upon a tenaceous brown clay subsoil, that seems to differ from the soil itself only in color, and although resting directly upon the gravelly clays of the drift, is itself quite free from gravel, and therefore would seem to have a different origin from the true drift. Whether this clay has been formed on the spot, by the growth and agency of a peculiar aquatic vegetation, as explained by Prof. Lesquereux, in his chapter on the "Origin and Formation of the Prairies," is a point that perhaps is not fully settled; but as it is, on the whole, the most plausible explanation that I have seen of the origin of the soil and subsoil of the prairies, I will beg your indulgence while I briefly state it in this connection. It is a generally admitted fact that, during the latter part of the glacial epoch, nearly the whole area of the Western States, north of the Ohio river, was beneath the water, and during the emergence of this wide area there must have been a period when the surface was covered with shallow lakes and ponds; and during this period the finely comminuted clay that forms the soil and subsoil of the prairies was deposited in the following manner, to quote the author's own words:

"In stagnant water, whenever shallow enough to admit the transmission of light and air in sufficient quantity to sustain vegetable life, the bottom is first invaded by *confervæ*, and especially by *characeæ*, and a peculiar kind of floating moss, technically known as *Hypnum aduncum*. These plants contain in their tissues a great proportion of lime, alumina, silica, and even oxide of iron, the elements of clay. Morover, this vegetation of the low stagnant waters feeds a prodigious number of small mollusks and infusoria, whose shells and detritus greatly add to the deposits. The final result of the decomposition of the whole of this organic matter is that fine clay of the subsoil of the prairies, which is truly impalpable when dried and pulverized and unmixed with sand. In the lakes of the high prairies, the phenomena sometimes present a peculiar character. At the depth of from one to three feet, the above-namd plants, mosses, confervæ and charas form a thick carpet, which hardens, becomes consistent like a kind of felt, and, floating about six inches above the bottom, is nearly strong enough to sustain the weight of a man. This carpet is pierced with holes, where fish pass to and fro, and the bottom under it is that fine impalpable clay, evidently a residue of the decomposition of its plants. At the depth of three and a half to four feet, this vegetation suddenly ceases, and the bottom is pure sand, with pebbles and shells. Near to the borders, on the contrary, at a depth of one foot, the carpet of mosses, etc., begins to be intermixed with sedges, which become more and more abundant in proportion as the depth decreases. As soon as the blades of these plants reach above the water, they absorb and decompose carbonic acid, transform it into woody matter under atmospheric influences, and then their detritus is at first clay mould, and then the pure black mould of the prairies."

I have only quoted some of the salient points made by the author, in discussing this subject; and those who would like to consult his views

more at length will find them set forth in detail in the chapter on the "Origin and Formation of the Prairies," in the first volume of the Geological Survey of this State. The theory above set forth is a very plausible one to account for the formation of the peculiar soil and subsoil of the prairies of this and some of the adjoining States, whatever may be our views as to its application to more extended areas, or upon the question whether its peculiar character and composition afford a satisfactory explanation of the absence of forest trees upon its surface. At any rate, it shows us how a soil may have been formed upon the surface it now occupies, by the growth and decomposition of aquatic plants, and hence form an exception to the general rule already given as to the origin of soils. But the prairie soil, whatever its origin, is one of the most productive in the West, and is rich in the essential elements required for the production of all the cereals, grasses, vegetables and fruits adapted to a temperate climate; and in its productive capacity it is not surpassed by any other variety of soil of equal extent upon this continent.

Whatever may have been the cause of the absence of an original forest growth upon the prairies, the fact has been clearly demonstrated that, when this soil has been once broken up, and the soil and subsoil mingled together with the plow, it becomes adapted to the growth of forests, as well as fruit trees, and the prairie farmer may surround his homestead with a luxurious growth of such forest trees as his interest or fancy may prompt him to plant.

When we leave the level of the high prairie, and descend but a few feet along the slopes leading to valleys of the streams, we find a decided change taking place in the color and composition of the soil, and by turning up the subsoil we shall find that composed of the gravelly clays of the drift. This is a true drift soil, and to it we are indebted for most of the upland forests throughout the prairie region. This soil is usually of an ash gray, or chocolate brown color, varying according to the character of the gravelly clays upon which it rests, and in point of fertility it ranks considerably below the prairie soil, and can only be successfully cultivated by constant manuring or by judicious rotation of crops. It is an excellent fruit soil, especially for apples and grapes, and the apple trees generally appear more healthy and the fruit fairer than those planted upon the level prairie.

Another variety of soil to which I shall call your attention, and with which many of you no doubt are familiar, is the soil of the Loess, or bluff formation, as it is sometimes called. Extending in a narrow belt, covering the bluffs on either side of all principal rivers, we find a deposit, ranging in thickness from five to fifty feet or more, consisting of buff and gray marly sand, frequently so coherent in structure that a cut of considerable depth through it will retain its perpendicular walls for years, this coherence being due probably to the carbonate of lime combined with the silicious material. The calcareous matter in this deposit frequently leaches out, by the precolation of water through it, and forms irregular shaped calcareous nodules, or fantastic concretions like the clay stones frequently found in the stratified blue clays of the Connecticut valley. Along the

Mississippi bluffs, in the southern part of the State, these concretions are quite numerous, and are locally called "petrified potatoes." The Loess gives origin to the round-topped, grass-covered hills, nearly or quite destitute of trees, that form a marked and pleasing feature in the scenery of our river bluffs; and though most conspicuous along our rivers, this deposit also extends in local patches into the interior of the State, and underlays the city of Springfield and a considerable area adjacent thereto. Oftentimes we find it overlaid by two or three feet of finely comminuted brown clay, precisely like that forming the subsoil of the prairies, and probably formed in the same way. The Loess itself is no doubt a sedimentary deposit that accumulated in the lakes that once filled the river valleys, and also extended over large areas away from them; and this also occurred during that period of emergence of which I have already spoken, and immediately anterior to the formation of the prairie subsoil. A casual examination of the Loess would lead any one to believe that it contained little else but fine sand, though a chemical analysis shows its composition to be about as follows: sand, 82 to 85 per cent.; carbonate of lime, 7 to 10 per cent.; oxide of iron, 3 to 5 per cent., with 2 or 3 per cent. of alumina, magnesia and organic matter. Locally, it contains a good many land and fresh water shells, and the carbonate of lime that it contains may be due to their presence and decomposition. It gives origin to a light, porous, free-draining soil, that is perhaps the best fruit soil in the State, and also well adapted to wheat and clover. A very large proportion of the vineyards in this State, so far as my observations have extended, are planted upon this soil; and the apple orchards located upon it are, in my opinion, as a general rule, more productive and yield a fairer and better quality of fruit than those planted upon the best prairie soils. It is quite probable, however, that some of the eminent horticulturists present are far better qualified to speak authoritively upon this subject than myself, inasmuch as your attention has been more especially directed to it.

In Great Britain, according to Dr. Ramsey, the able director of the Geological Survey of the United Kingdom, the best fruit soils are those derived from the red rocks; and as this coloring matter is usually, if not always the oxide of iron, it seems probable that its presence in notable quantity is one of the essential elements in a good fruit soil, and to this the Loess may owe, in part, its excellence as a fruit soil, as it is shown to contain from three to five per cent. of the oxide of iron. In speaking of the fruit soils of Great Britain, Dr. Ramsey says: "It is worthy of notice that the fruit districts of Great Britain lie chiefly upon the red rocks, sometimes of the old and sometimes of the new red series. The counties of Devonshire, Herefordshire and Gloucestershire, with their numerous orchards, celebrated for their cider and perry, lie in great part on these formations, where all the fields and hedge rows are, in spring, white with the blossoms of innumerable fruit trees. Again, in Scotland, the plain called the Carse of Gowrie, lying between the Sidlaw hills and the Frith of Tay, stretches over a tract of old red sandstone, and is famous for it sapples. What may be the reason of this relation I do not know,

but such is the fact, that soils composed of the new and old red marls and sandstone are better adapted for fruit trees than any other in Great Britain.

As we have no formations in this State that correspond very nearly with the red marls and sandstones of Great Britain, we cannot present any very pertinent facts in confirmation of the general conclusions above expressed; but I may say, just here, that the celebrated fruit zone of Southern Illinois, extending through Union, and thence eastward through the northern portions of Johnson and Pope counties to the mouth of the Saline river, lays upon, and has been largely derived from, a series of ferruginous sandstones, shales and limestone, some of which are strongly colored with iron oxide; and I think it is probable that the excellence of this soil for the production of fruit, as well as those red soils of Europe above mentioned, may be due to the coloring matter originally contained in the rocks, and which has now become a constituent part of the soil derived from their decomposition. There is a limited area in Southern Illinois, embracing all the most southerly counties, and a still smaller area in the extreme northwestern portion of the State, where drift deposits are entirely wanting, or are too thin to prevent the bed rocks from imparting their peculiar characters to the soil, and there one may readily observe the changes that occur on passing from one geological horizon to another of a different character.

There is still another variety of soil, covering a considerable area in this State, to which I will briefly allude before closing. This is the alluvial soil covering the flood plains of the river valleys, and popularly known throughout the West as "bottom land." This soil is variable in its character and composition, being sometimes exceedingly fertile, and in other localities sandy and poor. It is in part derived from the washings of the bluff soils from the adjacent high lands, and in part from the sediments left upon the surface by the river floods, and of course varies as the one or the other of these causes has predominated in its composition. The great "American Bottom," extending from Alton to the mouth of the Kaskaskia river, with an average width of three to five miles, is one of the most valuable tracts of alluvial soil in the West, and it was upon this that the earliest settlements in the State were made. This soil is a deep mellow sandy loam, and exceedingly productive. Some portions of it have been in constant cultivation for more than a century, with no perceptible change in its productive qualities, the sediments derived from the periodical river floods keeping the soil constantly up to its normal standard of fertility. As a rule, all the alluvial soils of the State are very productive, and for the cultivation of corn they take precedence over all others. As fruit soils they are also excellent, when sufficiently elevated above the flood plain of the rivers, and being usually of a light and porous character, are freely drained of the superfluous water that annually falls upon the surface.

I have now reviewed, briefly, the general character and source of derivation, as well as the probable methods of formation, of the principal varieties of soil to be found in this State, and it is no doubt quite unnecessary

for me to say to an audience of intelligent, practical horticulturists, that the elements of fertility in the soil, though essential, constitute but one factor in the sum of successful agriculture, and that the proper manipulation of the soil, so that the atmospheric elements that enter so largely into the composition of all vegetable products may be most readily obtained and appropriated, is another and equally important one to the success of your pursuit; and thus you become indebted to geology and chemistry alike for the knowledge necessary to the attainment of the most desirable results. Indeed, there is no pursuit in life where a general acquaintance with the elements of the natural sciences is more essential to success than in the cultivation of the soil, and hence the necessity of the introduction of these sciences as a necessary part of our common school system, so that every child that graduates from these schools shall be fully prepared, so far as the school room can prepare them, to enter upon the practical duties of a useful life under the most favorable conditions. It is not only necessary that those who till the soil should understand something of the geological character of the locality from whence the soil is derived, the manner of its derivation and the chemistry of its composition, but he needs to know as well the forms and habits of the insects that are destructive to his crops, as well as the parasites that prey upon them, so that he may successfully fight the one and cherish the other; and a knowledge of the elements of botany is also equally essential. Surely no vocation is more essential to the existence and well-being of our race than the cultivation of the soil, and in no way can those engaged in this pursuit elevate it to its proper standard, as one of the noblest to which men can devote their energies, than by bringing to their aid the requisite educational facilities, so that those engaged in agriculture and horticulture shall be the peers of those engaged in any other avocation.

The truly educated man is not necessarily the one most conversant with the dead languages, or the one who can converse freely in the greatest number of modern tongues, but rather the one who has the most comprehensive knowledge of the universe of which he is a part, and of the eternal laws by which that universe is governed and controlled.

The time is surely coming, in the progressive development of our race, when men, and women too, will be esteemed for what they can do rather than for what they possess; when the inquiry will not be in regard to the length of purse, the number of title deeds, or the sum total of the tax roll; but rather what he or she can accomplish in the production of such things as are necessary to satisfy the physical, intellectual and moral wants of the race, out of the elements of nature so bountifully provided by Divine Intelligence. Then the man who shall cause two blades of grass to grow where but one grew before, or the woman who shall devise a new and wholesome dish to replenish the wasted protoplasm of the father, husband or brother, as they return from their daily toil, will be esteemed as far more worthy members of society than the idle drones of the parlor, the sharpers who get up corners in wheat, the wealthy gamblers in stocks, or any other class of idlers who live exclusively upon the productive labor of their fellow men.

Man finds himself in possession of a world full of all the essential elements required for his highest enjoyment, and in the possession of powers and faculties adequate to produce from these elements the desired results, to amply supply the physical needs of the entire race, and when all are prepared to act their part in the productive industries of the world the whole human family may have an ample supply for all their needs. Much of the land now considered worthless will, in time, as our knowledge of agriculture increases, be made to yield abundantly, for "the desert must rejoice, and the wilderness be made to blossom as the rose." Here in the fertile valleys of the West, where the soil is wonderfully prolific, we have little or no conception of what man is capable of doing in transforming the barren wastes of the earth into fertile fields. Sahara is a name typical of barrenness and desolation, yet science has already accomplished much even there. The experiment of artesian wells was first tried there by the French, and afterward by the natives themselves, and finding that water could be obtained in this way, many tribes have abandoned their wandering life, planted palm trees, and commenced the cultivation of the soil. Laurent, a French writer, says: "Everything had been prepared to take advantage of this new source of wealth without delay. A division of the tribe of Selmia and their Sheik laid the foundation of a village as soon as the water flowed, and planted twelve hundred date palms, renouncing their wandering life to attach themselves to the soil. In this arid spot, life had taken the place of solitude, and presented itself with its smiling images to the astonished traveler. Young girls were drawing water at the fountain; the flocks, the great dromedaries with their slow pace, the horses led by the halter, were moving to the watering trough; the hounds and the falcons enlivened the group of parti-colored tents; and living voices and animated movement had succeeded to silence and desolation." There is no land so poor that industry and science cannot reclaim it. It is said that the Chinese carry the earth up the mountain sides, and deposit it on the bare rock, and succeed thus in raising valuable crops; and much of the famous wine of the Moselle is obtained from grapes grown upon earth carried up the cliffs on the shoulders of men. The lands that man's ignorance and wickedness have cursed, shall yet be redeemed by his intelligence and virtue. The valleys of the East, now lying barren and desolate, shall be redeemed and regenerated, and Palestine shall again become what it is said to have been, "a land flowing with milk and honey." Man, by his industry, wealth and increased intelligence, will eventually succeed in overcoming all the physical evils that surround him, and thus bring about the only millennium that can ever come to him upon the earth.

REPORT ON PRESIDENT'S ADDRESS.

TYLER MCWORTER reported as follows:

Your committee, appointed to report on the President's Address, would respectfully report that we consider the literary excellence and earnest thought of the address are such as do much credit to our worthy President.

The "spirit of unrest," so characteristic of the American people, is very ably treated. While it is true that through this spirit of unrest our people have reached their present plane of progress, it cannot be doubted that more encouragement should be directed to a love of home, and homestead improvements. That spirit of unreast should be properly *directed*, and not discouraged.

Home ornamentation, so ably discussed, should be assisted by the practical teaching of botany in our common schools, by devoting a portion of the school house grounds to the cultivation of ornamental trees, shrubs and flowers—thus bending the *infant twigs* in the proper direction; and the effects will appear in more tasteful and congenial homes.

Your committee would recommend the appointment of a committee of three, of which the Hon. J. W. Robison shall be chairman, to present to the General Assembly the *pressing need* of the Society for funds, and the public good that may arise from the same, to the end that an appropriation may be secured at an early day.

Your committee would further recommend, that the Treasurer be allowed a compensation of one per cent. on all moneys passing through his hands; and that the Executive Committee be required to take a good and sufficient bond from said Treasurer, of double the amount that may be expected to pass through his hands; and require all funds to be safely deposited in the name of the Society.

In reference to the meeting of the American Pomological Society, to be held at Baltimore next September, your committee would recommend that it be left with the Executive Committee to appoint one or more delegates to represent this Society at said meeting.

All of which is respectfully submitted.

TYLER McWHORTER,
B. G. ARNOLD, } Committee.
C. N. DENNIS,

Adjourned.

WEDNESDAY EVENING.

THE DISCUSSION

On Prof. WORTHEN's Report was brief, and related chiefly to the importance of natural science in a curriculum of study. It is a vice in our educational system that it does not make prominent the things that concern us most to know. Education that gives applause is preferred to that which aids the arts of life. The ornamental predominates over the useful. The *minds* of children are dressed as we dress their bodies—in the prevailing fashion. A boy is drilled in Latin and Greek, not for any useful purpose—not that he may read the great authors in the original (he can't read his diploma on commencement day)—but that he may

appear in the *role* of an educated gentleman. When there is so much to learn that is worth knowing, and so brief a time in which to acquire knowledge in this world, it becomes us to consider what is the relative values of "knowledges," and to take hold of the best things. Our public schools would do well to take into their courses of study more of the natural sciences—geology, entomology, chemistry, botany. There is already a tendency to improvement in this direction, and the wisdom of the change was freely commented upon.

Those engaging in the discussion were gentlemen—Hale, Humphrey, McWhorter, McAfee and Prof. Worthen.

Prof. Worthen said he did not intend to inculcate the idea that geology was a more important branch of knowledge than some others, but that it should have due attention, and we should give to it the importance the subject demands.

At this stage of the meeting,

Prof. McAfee announced the presence of Mr. E. H. Calkins (of Iowa). On his motion, the Society voted him an honorary member of the Illinois State Horticultural Society.

LANDSCAPE GARDENING.

Dr. A. G. Humphrey (of Galesburg) read the following paper on Landscape Gardening:

LANDSCAPE GARDENING AND THE DEVELOPMENT OF TASTE.

The early history of man is exceedingly obscure, but enough remains to convince the inquirer that he had a very humble origin. The best historical records, ancient architecture, and the nature and origin of language, are in evidence of his low and barbarous beginning. Evidently he was naked, both in body and mind. Without experience of the past, and without forethought of the future, he wandered in forests, guided only by the instincts of his nature. Urged by hunger, he was led to seek food to preserve his existence. Pinched by cold and scorched by heat, he learned to clothe himself with the skins of animals he had slain for food, and to construct for himself crude huts to protect him from extremes of temperature. The impressions he received from external nature aroused his dormant faculties, and by degrees developed his understanding. His wants excited *industry*, and the dangers with which he was surrounded developed his courage. He learned to distinguish between the noxious and the useful plants, to seek in various forms his food and his wealth, both from the animal and the vegetable world.

These simple but powerful incentives gradually drew man from a savage and barbarous state to a condition replete with enjoyment and pleasure.

The individual man, standing alone, felt his weakness; so men associated themselves together for mutual protection, and were thus enabled to construct for themselves convenient clothing and comfortable dwellings, and to store up in advance of immediate needs abundant and wholesome food. They cultivated the fertile fields, built cities, and founded great states and empires.

The early works of art were not beautiful, but massive and strong, and evidently designed more for protection than for ornament.

The beautiful landscape spread out by the hand of nature, the shady grove where he sheltered himself from the scorching sun, the mountain scenery and the gentle hill-side, the lovely valley, along which murmured the crystal stream, the little cascade or the thundering cataract, did not please a cultured taste or charm the eye of the infant man, but aroused in his sluggish mind sentiments of awe, of wonder, and, perhaps, of crude worship.

But these influences were potent agencies in gradually awakening him from a state of darkness and barbarism to a condition of civilization and refinement. The laws of society were so established as to obtain a common security. "The name of justice and equity was recognized and revered by all. Every man, assured of enjoying in peace the fruits of his toil, exerted all the latent energies of his soul; and industry, excited and maintained by the reality or the hope of enjoyment, developed all the treasures of nature and of art; the fields were covered with harvests, the valleys with flocks, the hills with choice fruits, the sea with vessels, and man was rendered happy in his rich possessions and powerful upon the face of the earth."

The forest landscape, by its grandeur, first attracted man's attention. Indeed, no species of landscape is so fitted for meditation. Dark, indeed, must have been the mind of the early traveler as he passed through the copses, dells and thickets of the varied forest, if it did not arouse in him an appreciation of the beautiful.

In the pristine ages of the world the groves were the only temples in which the Deity was worshiped, and to this *templum nemorale* one of the earliest forms of the artificial temple seems to have been indebted. It is believed that the Gothic arch of the cathedral churches was an imitation of the natural groves. It arises from a lofty stem, or from two or three stems, if they are slender, which, being bound together, and spreading in every direction, cover the whole with their ramifications. In the close recesses of the beechen groves we find this idea the most complete. The clustered pillars, whose parts, spreading without violence, diverge gradually to form the fretted roof, find there, perhaps, their earliest archetype.

The ancients held the groves sacred to Jupiter, and divine honors were paid to the oak by our Celtic ancestors. And the Druids offered sacrifices beneath its shades. The Romans crowned their heroes with green oak leaves, entitled to civic crowns. In these Christian times, it is a common expression, "The groves were God's first temples."

With the development of taste, and an ability to appreciate the beautiful in natural scenery, man was led to put forth his hand in imita-

tion of nature, and so create for himself new sources of pleasure and enjoyment; so we have the historic record that gardening, as an art of design or taste, is of quite ancient origin. In some specialties of the art, it attained a high state of perfection nearly three thousand years ago. The gardens of Solomon's time are described as highly artistic. The gardens of Cyrus, and other Persian monarchs, were of great extent, laid out in romantic situations, and noted for great diversity of scenery. The hanging gardens of ancient Babylon, adorned with terraces, are graphically described by the early writers. Ancient Greece, after she had attained wealth and power, and had made a great advance in the fine arts, especially that of sculpture, made great improvement over her Persian teachers in the art of gardening. Her gardens were extremely elegant, and were ornamented with temples, altars, tombs, statues, monuments and towers. They were as eminently fitted for public use as the parks of our day, securing shade, coolness, fresh breezes, fragrance and repose. The Grecian style of gardening was carried to Rome, and received great attention during her days of affluence and wealth, especially from the early emperors. The French and Dutch copied their gardens from the Roman style. It is said that glass was used to some extent in these ancient gardens, to protect tender plants; and rare trees, plants and flowers were to be seen in them.

When the glory of these ancient States was destroyed by cruel wars, and the inhabitants swept off by pestilence and famine, the few remaining relapsed into former barbarism, and our art languished and well-nigh died. During those long, dark ages—when religious fanaticism ruled the world, and the arts and sciences were nearly blotted out—the rural art, too, was sadly neglected or forgotten. But, with the revival of learning, and the discovery of the art of printing, our art sprang into new life and vigor. As in the early ages of the world, when men had abundant means and leisure, and the sciences were studied and the fine arts cultivated, our art flourished; so in later times, when Italy took the lead in painting, she also developed the geometrical and architectural style of gardening, which long served for European models. France, Germany and Britain imitated the Italian style, until the taste of man was sufficiently cultivated to develop the English or natural style of landscape gardening, which is now generally adopted both in Europe and in our own country. During the last quarter of a century our art has received quite general attention throughout the United States. The stimulus in this direction, and the success attained, is, no doubt, largely due to the organization and work of horticultural societies and the general dissemination of horticultural literature. As in every department of human improvement and industry time and means must be used, so every man of good taste in architectural design requires some means above his present or near prospective wants. No one can adorn and beautify his home with lawn, flowers, plants, shrubs and trees, and no city can secure public pleasure grounds, places, place-parks and park-ways, without incurring some expense. The leading question is, Will it pay, in dollars and cents, to adorn and beautify our homes, and to have large parks and extensive park-

ways connected with our towns and cities? And are there not other and higher ways in which it will pay, aside from the accumulation of wealth?

There is certainly no one, in our days of culture and taste, who does not regard a beautiful home, embowered with trees, with a smooth, well-grown lawn between the house and the road, slightly shaded with evergreens and deciduous trees, with here and there a bed of choice flowers cut in the green turf, with winding walks and road-ways sweeping to the front, and thence to the different out-buildings, of much greater value than if the same buildings stood in a simple lot or field. And the increased value of such a beautiful home is more than a hundred per cent. on the expenses incurred in its adornment.

If, then, every foot of lawn, and every tree, shrub and flower, tastefully arranged around a home, renders it more valuable, a question of profit should induce everybody to improve and beautify his home. What is true to the individual, in a pecuniary sense, is true of a city or town. The possession of fine gardens, large public parks and extensive park-ways, is a source of wealth to a city. In 1858 I passed over the rocky, barren district of Manhattan Island, where the great Central Park is now located. I visited the same place this last summer. What a wonderful change in a few years! One hundred and forty-two acres occupied by the reservoir of the city water works; fifty-five acres in meadow; fifty-four acres in small glades of turf; four hundred acres of rocky and wooded surface; forty-three acres in six pieces of water surface; fifteen acres in riding ways; fifty-two acres in carriage ways, and thirty-nine acres in walks, besides eight expensive bridges and sub-way arches—altogether constituting one of the finest sylvan and pastoral landscapes in the country. Capital and labor were required to secure such results in so short a time. At one time nearly four thousand men were employed on its works. Changes were wrought so rapidly, and the enterprise received such early celebrity, that the rise in the taxable value of the land near it more than met the interest on its cost.

It has attracted visitors from nearly every part of the world. The number sometimes exceeds one hundred thousand in a day, or about ten millions in a year.

The great success and popularity of the enterprise to the city of New York induced the cities of Philadelphia, Brooklyn, Albany, Providence, Baltimore, Buffalo, Chicago, St. Louis, Cincinnati and San Francisco, to secure large tracts of land for public pleasure grounds, and the enterprises have generally added material wealth to these cities. The topography of the ground at Chicago (and the same is true of our own city and a large part of our great State) is not desirable to secure the most pleasing effect in landscape gardening, and yet, under the skillful management of a board of landscape architects, the 1,900 acres of Chicago's public grounds are rapidly being converted into most attractive and beautiful resorts. Her fine chain of parks, with her twenty miles of park-ways, provided with good macadamized or concrete roads, well planted with trees, are already attracting the attention and admiration of Eastern as well as Western visitors. I am sorry to say that our own city is deficient

in the extent and beauty of our public grounds. It does not comport with the wealth, intelligence and good taste of our people. With such good taste exhibited in many of our private grounds, laid out in most excellent artistic design, we should have extensive and beautiful public grounds. It is due, however, to say that through the influence of our local horticultural society a competent and energetic board of park commissioners has been created by our city fathers, and we confidently expect that in the near future we shall have extensive public grounds, so skillfully and artistically designed, and so elaborately beautified, as to attract thousands of visitors to admire and copy after our excellent taste.

The cultivation of our art, both in public and private grounds, is essentially a school of science and art. To lay out and arrange grounds in the most pleasing manner, requires great architectural design and artistic skill. To plant trees, plants and flowers successfully, requires a study of their names, habits and varieties, so leads to a knowledge of botany and vegetable physiology. These scientific and intellectual advantages are of great importance, but much more important is the moral elevation of the people where our art is highly cultivated. He who is led to contemplate the beautiful in nature and art must necessarily grow more moral and more refined. Beautiful and attractive public resorts in a city may lead thousands into their quiet shade to commune with nature, and thus escape the city temptations which lead to ruin.

Our art is largely cultivated in the laying out and adorning of our cemeteries, and it seems befitting to spread around the last resting place of our friends the beautiful lawn, and plant profusely the Coniferæ, whose green foliage, remaining in the dead of winter, ever reminds us of the Christian's hope of a better life. We should go back a little to the custom of the ancient fathers, who worshiped in the groves, and secure for our churches large grounds and surround them with all the attractions that a beautiful landscape can give, and thus invite the forest songster to unite his songs of praise with the Sabbath worshipers.

It is our duty as horticulturists to commence in our day a new enterprise in the culture of our art, which may result in the future wealth and prosperity of the country, and the intellectual and moral improvement of our children. That is to so arouse and mould public opinion on this important subject, that in the near future we shall have every school house in our land surrounded by a botanical garden, where every child shall be taught the value and use of trees and plants, architectural design in the laying out of grounds, and the highest order of taste in beautifying and adorning the school ground and the home.

Let the children lay aside the arbitrary rules of books, and listen to a competent object teacher discourse to them about the birds they can see in the trees, the pebbles easily picked up by the wayside, and the insects found upon the plants and flowers. In this way our children may know more of botany, ornithology, geology and entomology than the classic scholars of to-day.

This is no fanciful picture, no idle dream; the work has already begun. We have an Industrial University in successful operation in

nearly every State, and the system of object lesson teaching is found to be eminently successful, and has been introduced into many of our schools.

The whole world, so beautifully spread out by the hand of nature, is the great open text-book for our children. Here they can learn to read the rocks and leaves, the insects, the birds, the depths of the sea and the stars in the heavens, and their studies, which are now so irksome, will become pleasurable pastime. We have in our own State the groundwork of wealth and beauty. Our deep, rich soil furnishes the resources of immense wealth, and only awaits development by the hand of agriculture. And with the study of our art, and the development of good taste, every residence in our land will become a beautiful, attractive and comfortable home.

Prof. O. L. Barler (of Hinsdale) read a paper which excited some merriment, entitled, "The Prospects of Horticulture on the Planet Mars."

THE AMERICAN FORESTRY ASSOCIATION.

Prof. H. H. McAfee (of Iowa) made a statement in the interest of the American Forestry Association, of which he is the honored Secretary, and Dr. Warder (of Ohio) is President. He gave an outline of what the Association had done, and what it was proposed to do; and he magnified justly the office work of this Association, and invited co-operation in this State. Great things are to be attempted by this Forestry Association, and great things are expected of it, and what we want is general co-operation, that we may secure the best results. He requested that a committee be appointed by this Society to co-operate with the American Forestry Association in the furtherance of its work. The following gentlemen were appointed said committee: H. D. Emery, Chicago; F. Butterworth, Quincy; W. C. Flagg, Moro; T. J. Hale, Galesburg.

Adjourned.

THURSDAY MORNING.

Prayer was offered by Mr. S. G. Minkler, when the Society proceeded to the election of officers, which resulted as follows:

President—H. G. Humphrey, M. D., Galesburg.
Vice-President—J. W. Robison, Tremont.
Secretary—O. L. Barler, Hinsdale.
Treasurer—S. G. Minkler, Oswego.

Ipaiva, Fulton county, was selected as the place for meeting next year, at such a date in December as the Executive Committee may fix upon.

ON ORNITHOLOGY.

C. W. Douglas (of Waukegan) sent in the following report on the subject of Ornithology:

Our esteemed friend and co-worker, J. W. Velie, Esq., of the Chicago Academy of Sciences, in his excellent report on "Birds Beneficial and Injurious to Horticulture," read before your honorable body at Galesburg, December, 1870, said: "I have made no mention of the robin, catbird, thrush or blue jay. Very much has already been written in regard to the benefits and injuries done by these birds. Some, in writing from the southern part of the State, claim them to be injurious; while the 'Douglas' from the north claims these, and also the gluttonous cherry bird (*Ampelis cedrorum*), to be beneficial." Below I give some of the reasons why we think they are *beneficial* and not *injurious* with us; and I think, when their habits are better understood, there will be a great many of the same mind.

The Robin (*Turdus carolinensis*).—This common and well-known bird is one of the best friends we have, though none of our birds are more unpopular with horticulturists than this one, although the prejudice is unjust and unfounded. They destroy nearly all kinds of grubs, larvæ and worms that inhabit the green sward and cultivated soil, and a great number of crickets and grasshoppers, the larvæ of locusts, harvest-flies, beetles, etc., when turned up by the plow or hoe, and the great pest known as the cutworm, which emerges from the ground by night to commit depredations on the cabbage patch, melons, beans, etc. And as the robin is one of the earliest birds abroad in the morn, searching for food, it destroys great numbers of this pest. The services of the robin, in destroying this pest alone, would more than pay for all the fruit it eats. During the breeding season, the robin is hardly ever seen without one or more worms in its beak, which it designs for its young, of which it raises two broods in a season.

The Cat-bird (*Minus carolinensis*).—There is also a prejudice against this bird by those who look upon the bad side of everything. It rears its young, and gets most of its food, in that great harboring place for noxious insects, "the neglected corner," which is to be found in nearly every garden grown up to underbrush, briars, etc.; and if it shows itself out of its dark retreat, it is most unmercifully slaughtered for some fancied wrong. It is one of our most melodious songsters, and a great mimic. There is no bird which appreciates kindness more than this one. There is a pair which nests in an evergreen near our house, the male of which perches himself in front of the house, and pours forth his melodious lay for hours at a time.

The Baltimore Oriole (*Icterus Baltimore*).—This bird, which is said to trouble the gardens and vineyards through the central and southern portions of the State, rarely touches a single berry with us, to which he is justly entitled for the great number of injurious insects which he

destroys, especially the canker worm and tent caterpillar. It is one of our best-known door-yard visitants. Its sprightly ways, rich and mellow song, and gaudy plumage, make it the favorite of all.

CHERRY BIRD (*Ampelis cedrorum*).—This beautiful bird is a resident of the whole United States; is condemned and slaughtered by horticulturists more than any other bird. But those who have interested themselves in studying the habits of this bird are willing to let him have a share of the fruit he works so hard to save; for he does work hard, and to the point, as it is a well-known fact that he destroys more larvæ of the canker worm than any other bird. And even in the cherry season, when it is driven from every garden (and pays the forfeit with its life if it enters), it may be seen, in the edge of the evening, catching moths and other destructive insects, with which the air is then filled by wholesale. I think one will do more good, by destroying injurious insects, in two months, than five English sparrows (over which our Eastern friends are going wild) will do in one year. And I do not think it will benefit horticulture to kill off our native feathered friends, and import foreign ones, when it is well known that they have worse habits than our own. It is the only bird which seeks and destroys the cherry slug, which furnishes no small item in its larder.

SAP-SUCKER (*Sphyropicus varius*).—This bird, which has not a single redeeming feature, is one of the greatest pests we have. As its common name, "sap-sucker," denotes, it lives almost entirely upon sap and the soft under bark of trees, which it mangles and destroys in great numbers, to obtain its favorite food, as, by the formation of its tongue, it is unable to draw insects from the bark of trees, like other woodpecks, which, with the above exception, are among our best friends.

BROWN THRUSH (*Harporhynchus rufus*).—This beautiful songster is also tabooed from the gardens for taking a little fruit, for which it more than pays us by its good qualities, sociabilities and beautiful song. In spring it scratches among the leaves for worms, grubs and other insects, which seek these places to winter in, and during the summer, when it is shot for taking a few raspberries or strawberries. I think the gunner will find, if he watches him a few moments, that he eats more grubs and other insects than berries. There are seven or eight species of thrush found in this State, all of which are the fruit-growers' friends.

I wish the law was enforced for the wanton killing of birds, and the robbing of their nests; and in the course of five years we would see what a very great decrease there would be in noxious insects.

C. W. DOUGLAS.

WAUKEGAN, Ill., Jan. 11, 1877.

REPORT ON GENERAL HORTICULTURE, FROM THE SIXTH DISTRICT.

W. C. FLAGG read the following paper on the condition of general horticulture in the Sixth District:

Your committee from the Sixth, or Alton District, has thirteen counties from which to secure reports. From nine of these, through the

kindness of correspondents, he is enabled to make fifteen reports. From the other four no direct information has been gained. From Bond, Clinton, Greene, Jersey, Macoupin, Madison, Montgomery, Randolph and St. Clair I have received interesting reports. From Calhoun, Monroe, Perry and Washington nothing has as yet been received.

The counties from which reports have been received I have placed in their alphabetical order, and will now proceed to give you the reports therefrom, before expressing any conclusions of my own.

BOND COUNTY.

E. GASKINS, of Mulberry Grove, Bond county, says:

"*Peaches* in this county proved a failure this year. *Cherries*, but few. *Grapes*, a very short crop. *Apples*, I think, might be said to be about half a crop; not more, if the bitter rot be taken into account. Even the Rambo on old trees suffered badly, as did the Ortley in my own orchard, on trees about fifteen years old. But there is no demand for them, so we have more than we can make sale of. We cannot ship them from this part of the country, from the fact that barrels, freight and other charges more than use up proceeds of sales. I planted my orchard for experiment rather than profit, and I am glad I did, as it saves me from disappointment. My Yellow Belleflowers have not borne a crop for four years. This spring they promised well, but proved an entire failure, owing, I think, to frost in spring. I do not think that growing apples in this locality can be made profitable. But if I was setting out an orchard *for profit* here, I would plant but three sorts, viz.: Ben Davis, Wine Sap and Nickajack. All summer and fall apples (more than the family needs) are worthless; and, so far as my observation and experience enable me to judge, winter fruits are not much better.

"I should like to know what fruit growers think of the Nickajack. My experience with it is rather limited, my trees just beginning to bear; but the trees are good growers, fruit of good size and color, and hangs to tree well."

[The Nickajack has been grown many years by L. W. Lyon, near Bethalto, Madison county, and has succeeded well with him, but not so well as to be decidedly preferred to other sorts.]

CLINTON COUNTY.

Dr. M. M. HORTON, near Centralia, but in Clinton county, gives the following account of the season:

"We have had more than an average crop of *Apples*, no *Peaches* nor *Plums*, a fair crop of *Cherries* and *Strawberries*, and few *Blackberries* and *Raspberries*.

"The *Apple* crop has been much injured by the bitter rot and premature dropping from the trees. Notwithstanding these, we have saved more of the crop than usual. It is too early to determine whether or not our apples will keep well through the winter. There is much rotting in the bins, and fears are entertained that much loss will be experienced in this way.

"There have been very few trees of any kind planted in this county this year, and if prices continue as low as they now are for fruit of all kinds, we may not expect an early increase of planting. Price of apples, from ten to sixty cents a bushel; average, twenty-five cents.

"There are too many theories in regard to the causes of 'bitter rot,' for me to indulge in this direction; but I would merely suggest the inquiry whether the effect of manures as a remedy have been tested.

"*Cherries* were fair and comparatively free from curculio, the Early May being the favorite.

"The Wilson *Strawberry* still maintains the ascendency here as the market berry; the crop being rather below the average, and selling lower than usual. The acreage will be fully up to the average, and the plants look very fine.

"All *Raspberries* have been killed nearly to the ground, by summer drouths, for the last three or four years, so that there are few plantations in this region in good condition.

"*Blackberries* were killed by cold the last two winters; and this, with the yellow rust, has diminished this crop very much. All varieties seem to suffer about equally. The rust seems to be worst on rolling ground."

B. PULLEN, of the same locality, writes:

"I can give you no new facts about the bitter rot, except that it is rapidly on the increase, and threatens strongly to render our orchards worthless. I still think that it is contagious. I regard the past two seasons as very favorable to its development, being very wet and hot. I will mention another item that may be of interest, and that is, that whenever it makes its appearance on a tree I have never known it to fail to reappear the following season, and the tendency is to get worse and worse. I have observed this for a number of years.

"The condition of horticulture in Clinton county is anything but promising, if I except the single item of Strawberries. With this exception, I would say it was on the *decline*. Peach orchards may be said to be very nearly a thing of the past; ditto, Pears and Cherries. The disposition to rot in Apples and Grapes, together with the low prices that have prevailed, have produced great neglect on the part of many towards their orchards and vineyards; indeed, some of the latter are being dug up."

O. B. NICHOLS, of Carlyle, Clinton county, says:

"Our *Apple* trees were nearly all killed five years ago this winter by freezing, with a few exceptions, and it is a mere question of time with them all going over. The trees of five or six years stood the winter well, and are now in full bearing. The fruit on the young trees is as good as common in this country. The fruit on the old trees, of which we had an abundance, was badly affected with bitter rot. There has been such a surplus of fruit in this county, the last four or five years, that there has been little attention paid to setting out new orchards.

"Nine-tenths of the *Peach* trees have been killed during the cold winter of 1871. The new trees that have been set out since then are now bearing, the product of which supplied the local market.

"*Cherries* were three-fourths of them killed; consequently, very little from them. The old Morello is the only fruit of the kind cultivated in the county.

"The cultivation of *Pears* is limited in this county, but they bear well, to the amount of trees.

"*Raspberries*.—About every other year Antwerps kill down, but, if cultivated, we usually have a crop.

"*Gooseberries*, plenty.

"*Strawberries*.—Nearly everyone has his strawberry patch; some, their acres. In the eastern part of the county they are cultivated for the Northern market, and pay well.

"*Currants* do not do well in this county, and are very little cultivated.

"*Wild Black Dewberries* in abundance, and are cultivated to some extent, and bring a high price in the market.

"*Blackberries* in abundance, and bring from 25 to 50 cents per bushel.

"*Garden Vegetables* of all kinds in abundance, and scarcely pay for raising.

"*Grapes* are becoming a decided success, and a large amount of wine is being made; and home affords a market for surplus product of wine and fruit. Fruit selling from 2 and 4 cents per pound. The unusual amount of wet this summer, and the want of attention in tying up the vines caused the larger amount of them to rot on the vines.

"*Walnuts* and *Hickory Nuts* in abundance to winter on. Sold at 25 cents per bushel."

GREENE COUNTY.

J. C. BURRUSS, of Carrollton, Greene county, says:

"The summer *Apple* crop was unusually large. Every tree, of every kind, in every place, was full. The winter apple crop is above average—some orchards very full, others only reasonably so. Some varieties dropped badly.

"*Peaches* were an entire failure in most orchards, but an occasional one had a good crop.

"*Grapes* almost all rotted, except on young vines, where an occasional crop was secured.

"*Small Fruits* are little raised here. Crop about an average, except blackberries, which were very abundant, especially the wild ones."

JERSEY COUNTY.

ORVILLE A. SNEDEKER, for Isaac Snedeker, of Jerseyville, Jersey county, writes as follows:

"The *Apple* crop can be said to have been very fair the county over, though not heavy. While some orchards have been very heavily loaded, others have had a very light crop. Among the best bearers for the year, I think, have been the Smith's Cider and Wine Sap. They have been comparatively free from the bitter rot. What did appear was perhaps caused by the wet season. More free from scab than usual, though from some cause unknown the crop did not hang on the trees until matured and ripe, but fell off badly. This is so of all varieties.

"*Peaches.*—Were but few raised; scarcely any maturing in a good first-class manner. Cracked open, and were scabby and bitter, and poor satisfaction indeed for any one to try and have a feast on the delicious fruit, unless he relished worms and bitter fruit.

"*Plums*, *Apricots*, *Nectarines* and *Quinces*, were poor.

"*Cherries* were rather a light crop.

"*Blackberries*, *Raspberries*, *Strawberries*, *Gooseberries* and *Currants*, were all abundant, which was perhaps due to the wet weather which predominated during the earlier part of the season.

"*Vegetables* were all abundant, except cabbage, which was poor. A little louse seemed, with the help of the cut worm, to destroy several of the plantings.

"*Flowers* of all kinds were abundant. And all kinds of trees made a good growth.

"*Grapes*, I had forgotten to say, were a poor crop. Many varieties were bitter and sour; fell off badly, on account of wet weather; and many kinds rotted on the vines."

JAMES E. STARR, of Elsah, Jersey county, says:

"My own experience and observation with regard to the fruit crop has been, the past season, quite limited. In the early spring, I made some careful observations of some thirty varieties of *Apples*, which, with exceptions, promised finely. The result has not fulfilled the promise. The scab utterly ruined many sorts, the worst being the Ortley, the Carolina Red June doing but little better. This trouble is now the most formidable that the apple-grower has to overcome. Some varieties do not seem to be affected by it, and by limiting ourselves to those orcharding may be made a success.

"The Early Harvest was a failure. About the period of re-opening, the weather was warm and damp, so that a few days ripened and ruined the entire crop. I have noticed (what has probably been noticed by others) that the leaves of those apple trees whose fruit is scabby are unhealthy; they have upon them spots somewhat like the appearance of mildew upon the grape leaf. Whether there is any connection between this spot and the scab I am unable to determine; but certain it is that you find the two

together. Wine Sap small, and affected with the bitter rot. Rawles' Janet, Rome Beauty, Hubbardson, have done well.

"*Peaches*, *Cherries* and *Plums* were a failure, except seedling peaches, which were quite full.

"*Grapes*—Concord, half a crop; rotted more than I ever knew. Other varieties I do not grow largely. Catawbas, a small crop; no rot.

"*Small Fruits* and *Vegetables*, but little grown.

"I have noticed, for a few years past, the loss of young black oaks. They die out, and I do not know the cause. Large quantities of timber are being cut, and the land cleared for cultivation. No timber planting, except by Mrs. Ames, who is planting largely of larch and evergreens.

CALHOUN COUNTY.

"Orcharding not extending. The orchards of Mr. Williams, of Fruitland, gave only a moderate crop of *Apples*. Other fruits a failure."

MACOUPIN COUNTY.

E. Aug. Bechtel, of Staunton, Macoupin county, sends me the following:

"It appears to me that in consequence of the hard times the planting of trees, vines, shrubs, etc., of all kinds, has been very light the past year, as far as my knowledge goes.

"The season again has been very wet at times, although the water did not do as much damage as the year before. The annual growth of all kinds of grape vines, shrubs and trees, including the *Evergreens*, has been wonderful. *Vegetables* of enormous size were produced. Even the *Celery* (generally a vegetable very difficult to raise in this climate) did well.

"The *Apple* orchards did, generally speaking, better than last year, although the fruit was not much better in quality. The Red and White June and Rambo did well again; so did the Hubbardson, Non-Such, Penn. Red Streak, Ben Davis, Milam and Wine Sap. The Rawles' Janet bore well, but the bitter rot was as bad as ever. The cause of this disease I have not yet ascertained, although to all appearance an insect is the origin of it.

"*Pears* blighted badly, and the fruit was scarce and high-priced.

"*Peaches* an entire failure again.

"*Cherries* bore full, but were injured by the curculio as bad as the year before.

"*Vineyards* were, in most parts of the county, an entire failure also, a few young plantations being the exception, and the fruit of them brought good prices. The Ives, Martha and Morton's Virginia proved again to be the healthiest vine in regard to fruit and foliage.

"All kinds of *Small Fruits* bore well, and the fruit was of excellent quality; the Mammoth Cluster and Philadelphia *Raspberries* and the old Red Dutch *Currant* were the varieties that did best with us.

"The 'Snyder' *Blackberry* bore wonderfully, and it seems to be extremely hardy. I believe this berry will be the best for family use; it is not quite so large as the Kittatinny, but it has less hard pulp and the plant is hardier. It is altogether a very promising variety. Respectfully yours,

"E. Aug. Bechtel."

MADISON COUNTY.

F. Hayden, of Alton, Madison county, communicates the following:

"I may report a tolerably full crop of *Apples*, with very low prices—I think I may say with little or no profit to the grower. Ben Davis and Smith's Cider are the most profitable. Some bitter rot among the Rawles' Janet.

"A few favored localities had a partial crop of *Peaches*, which of course sold well."

"*Pears* were rather more plentiful than peaches, but still not one-third of a crop. More blight than I ever saw before.

"*Grapes* (Concords and Ives) have produced a fair crop, of better quality of fruit than usual; and they have proved, all things considered, as profitable as any fruit I raise.

"*Strawberries* were in abundance, and cheap. Two hundred bushels only brought me seven hundred dollars. Boxes, packing, and all the cost of making the crop out of that, left but a small profit. Charles Denning, Wilson's Albany, Boyden's No. 30, and Monarch of the West, the best varieties.

"*Red Raspberries* (Kirkland) produced a good crop very early, and sold at paying prices. Some claim a profit, also, in growing the Turner. The Thwack is the most promising new red raspberry in the West. May prove valuable.

"Lawton and Kittatinny *Blackberries* have proved (as for many years previous) one of the best-paying crops in this locality. Other sorts not sufficiently tested to recommend.

"*Asparagus*, in a limited way, pays at the rate of three or four hundred dollars per acre; but when it is attempted to raise it on a large scale, has hitherto failed.

"*Tomatoes* are not profitable about Alton of late years. Growers farther south have the advantage of us."

Dr. N. F. Long, of North Alton, Madison county, sends the following:

"In relation to orchards, etc., there have been some unusual and discouraging phases connected with them the past season. The winter of 1875-6 was very mild, the thermometer marking zero but once, and only for one night; consequently, the trees could not be damaged by hard freezing. The spring commenced early, and continued quite warm. Warm showers of rain were frequent all through the months of April, May and June, contributing to the early and rapid growth of the stock and branches. The blossom was more than an average one, and everything pertaining to a good crop of fruit was very flattering, including peaches. In May, near the first of the month, a few chilly days and nights changed the prospect for the apple and pear crop, and most of the germs were destroyed. The fire blight also made its appearance—which, according to the frozen sap theorists, ought not to have affected the trees at all—and was more fatal to the trees than ever before in this locality. I am thoroughly convinced that this fatal disease is climatic, and that our best preventive is to retard the growth of the trees by planting the orchard on poor land, cutting back the top in July or August, or root-pruning before the growth commences in the spring. The apple crop was extremely variable. But one orchard in this whole region produced a first-rate crop of fine fruit; others varied from a fourth to three-fourths. The orchard producing well was upon a high timber ridge, with timber on the north of it.

"*Pear* trees produced a good blossom, but the crop was blasted by the blight, and several kinds, considered as exempt from that disease, were extensively affected, and others, in great number, were killed outright.

"*Peaches* suffered by the wet and heat of the season, and a larger number of kinds than usual rotted upon the trees. It was a bad season for them generally; but a few orchards near to the river did well. The principal damage to the prospect was by a severe frost just before the blossom opened.

"The *Strawberry* crop was below the average. *Blackberry* crop good. Of *Raspberries*, some varieties did well, but generally below the usual crop.

"The quality of the fruit of all kinds was inferior in flavor, owing, probably, to the frequent showers and continued damp weather. The keeping qualities of it were much impaired by weather and insect depredations, and it rotted on the trees, vines and shrubs, and in every package and place in which it was deposited.

"*Apples* and *Pears*, hitherto our dependents till fruit grows again, are decaying more rapidly than I have ever seen before. The season, on account of its being very warm, was favorable to the increase of insects, and they came in their strength. I think

I speak within bounds when I say, that of early and summer apples there was not one in ten that ripened exempt from the attack of some insect; the apple-worm and curculio were in legions.

"*Grapes*, of most of the varieties raised here, were also rendered worthless by a worm, and in large clusters not more than from one to three berries could be found exempt from them.

"To sum up in a few words: The season has been very discouraging to the fruit-raiser, both in the crop and market. The business is overdone, and though every man should have an orchard who has land to make it on, yet fruit-raising has ceased to be remunerative, as in times past."

JOHN BALSIGER, of Highland, Madison county, says:

"The past season has, on the whole, not been a very favorable one to the horticulturist and fruit-grower in our part of the county. The mildness of the last winter, for a long time, never quite stopped the flow of the sap in the trees and shrubs, and after that we got some cold nights in the months of March and April, and heavy frosts, when peach, plum, pear and cherry trees commenced to unfold their blossoms. When in protected localities the apple bloomed, heavy rains partially prevented the fecundation of the flowers. A very wet and stormy summer injured the little fruit there was, particularly grapes, to a considerable degree.

"But I will take each class of fruits, one after the other, and speak of each separately.

"*Apples*.—Some apple orchards, probably such as in consequence of their position bloomed rather late, produced abundantly, while others, as I have already said, showed but little fruit. I attribute this to no other cause than this, that the last-mentioned came into bloom earlier than the others, and the blossoms were injured by rains; and when the flowering time of the later ones came on, the weather was more favorable. I think that my supposition is right is proven by the fact that early blooming trees bore but little fruit, even those which were quite white (or rosy) with flowers, while late bloomers, as for instance the Janet, bore well. In late summer and fall much of the fruit was affected by dry or bitter rot, but not all varieties. Those most attacked were: White June, Rambo, Pennock or big Romanite, Green Pippin, Golden Seedling (worst of all), Red Winter Pearmain (I do not know whether this is the true name of the variety), Milam, Hermann, Penn. Redstreak, Jenneting (Janet) and small Romanite somewhat, but not very much. Proved healthy: Red June, Early Harvest, Ben Davis, Limber Twig, Willow Twig, Newtown Pippin, Wine Sap, Rome Beauty (tree very young yet, an early bearer), Tolman Sweet (fell off early), Yellow Bellflower, also Early Pennock, Esopus Spitzenberg, and Red Astrachan. Many varieties fell off too early. The different Siberian Crabs were not bearing, in consequence of their early blooming. The Northern Spy fell off early, and rotted on the ground. Priestly bore poorly and very scabby fruit. Hewe's Crab bore little with me, but well in other orchards. If we take the average of our part of the county, the apple crop was about a medium one.

"Not so the *Pear* crop. The blossoms opening earlier than those of the apple, suffered from late frosts, and the trees from blight, and some from storms too. I got a few Bartletts (blighted considerably) and Flemish Beauties. That was about all; but I have not many trees in full bearing. Pears were very scarce in this neighborhood.

"Of *Peaches*, only seedling trees showed some fruit, but this was stung by the curculio, got wormy and rotted. Peaches very scarce also.

"*Plums*—None at all, except some wild ones.

"A number of Portugal *Quince* trees, coming just into bearing, had some nice fruit and bore well enough, while the Apple Quince, older trees, did not bear at all.

"Of *Cherries*, only a few of the Early Richmond. The Bigarreaus had their blossoms killed by frosts.

"Of *Grapes*, nearly all varieties rotted more or less. Nearly all the fruit destroyed by rot are: Concord, Telegraph, Rogers' No. 2, North Carolina, Black Defiance and Triumph. Three-fourths of the crop destroyed: Alvey, Creveling, Golden Clinton, Herbemont, Isabella and Martha. Half: Mary Ann, Maxatawney, North Muscadine,

Rulander, and Massasoit. One-fourth: Cynthiana, Norton's Virginia, Cunningham, Goethe, Taylor, Cottage, Ives (bore nevertheless a very heavy crop). Very little affected by rot: Hermann (a young vine), Perkins, Peggy (a very foxy, small and valueless grape), Delaware and Hartford. Badly mildewed: Catawba, Delaware, Maxatawney and Croton. The fruit of all this latter class did not ripen. The best yield was from Perkins and Ives.

"I wish somebody could explain what the real cause of the diseases, particularly the rot, of the grape, was. If it was the heavy and frequent rains of the summer and the water-soaked soil, then why did the Concord here rot the worst in high dry positions, where the water would run off quickly, while in low and level places, where the water for many days remained standing, there was hardly any rot at all? It was so in the low and level gardens, in the town of Highland, where the free circulation of the air was obstructed by buildings, trees, etc. Might this rot not have been caused by a fungus growth, favored by the sultry, damp and hot atmosphere, the spores of which could not penetrate everywhere, and were not equally favored by the condition of the skin of all varieties? And might not the bitter rot on the apple be the same disease on another fruit, and the effect of the same cause?

"*Strawberries* did tolerably well, but yielded not quite a full crop.

"*Raspberries*, particularly the Turner, and also the Black-caps, bore well.

"The Kittatinny *Blackberry*, the same.

"*Gooseberries*, hardly any; blossoms destroyed by frosts in spring.

"Of *Currants*, a tolerably good yield.

"Of *Wild Fruits* there were some blackberries, very few hazel, but plenty of walnuts and hickory nuts and acorns. Also persimmons, of which I have an excellent variety, originated in Missouri, grafted on a male tree which now bears well."

MONTGOMERY COUNTY.

John M. Neisler, of Irving, Montgomery county, says:

"Fruit crop below an average. *Apple*, good yield, but not keeping well; wormy. *Peach*, almost a total failure, owing to bad condition of trees; affected by freeze of past winters, and borers. *Cherry* and *Pear*, very light crop; pear blight badly. *Blackberries*, Lawton and Ohio, ever-bearing, crop good, and have made good wood. *Raspberries* and other small fruits, small; fruits light.

"I would further add a description of the Neisler apple—that it has been known and tried in old Montgomery county for the last twenty-five or thirty years, on different locations, and proves itself well. There wasn't any bitter rot, or any other bad qualities."

Knodle Brothers, of Irving, Montgomery county, say:

"In reporting you, we would say that the past season opened with a promise of fine fruit and a fair crop, the trees not being overloaded, the late frosts having done considerable thinning of the blossoms and small sets. But at the present writing we can speak as to the profit. The quality of many apples was inferior—winter apples generally not keeping well. This, we think, is owing to the long-continued warm weather, and the fruit being left to come to maturity upon the trees, our experience being that fruit picked before severe frosts keeps the best.

"As to the most profitable varieties this year, by very general observation, we believe, are Ben Davis, Willow Twig, Dominie, Janet, Wine Sap and Carthouse. Some other varieties are now commanding attention, viz.: Stark, Grimes' Golden, Lawver, etc. Grimes we know to be a great bearer of fine fruit, in parts of Iowa; also hear favorable reports of Stark from same quarter, while parties at St. Joseph, Mo., inform us that the Lawver is well known in their fruit district as a profitable sort. We should like further information on Stark, Lawver, Missouri Superior and Missouri Pippin. Of fall varieties, we find the Rambo, Fall Wine Sap and Maiden's Blush the most profitable, while Hubbardson and Non-Such commanded attention. Of summer, Early Harvest, Red June, Benoni, Duchess and Red Astrachan are most profitable.

"*Pears.*—We can give but little information; our trees are yet young. We find, in different parts of our county, standard pear trees, thirty or forty years old, that seem to bear annual crops of rather inferior fruit. They are in most instances seedlings, and are free from blight.

"*Plums.*—The Wild Goose is the best. Curculio nearly stripped it last season. The crop of native plums in the woods was abundant, however.

"*Cherry.*—Richmond leads with good crops. English Morello fair, and some of the Dukes. We are reminded of a tree (May Duke) growing near Pana, which is eighteen inches in diameter and some twenty-five or thirty feet high, growing almost against the smoke-house. Its owner informs me that at times several bushels of fruit have been taken from the tree. We believe that the shade the building affords the body of the tree in winter is the cause of its vigor and long life, as that class of trees do not generally succeed well here.

"*Peaches.*—The crop was light. Hales, Tillotson, York and Rosamond were the varieties that bore.

"*Small Fruits* generally good. For trees in nursery, the past season has been one of unusual growth.

"For *Evergreens* generally, the season was too wet. Many small transplants died from the effects of too much water. The heat of the sun and water 'scalded' them. Scotch Pine, for wind-break purposes, is first-rate here; it succeeds well in our soil, and grows rapidly. White and Red Austrian, Dwarf Mountain, succeed well; Corsican, Ponderosa, Contorta, and some others, not sufficiently tested, but have succeeded fairly; Norway Spruce truly excelsior; American Spruce slower grower, but great beauty. Of firs, the Balsam, Euphrates, Silver and Frazer's all do well. Irish, Swede and Pyramidal Juniper grow well. Hemlock does fairly—much better when well established and kept mulched. Retinisporas, several varieties; they are tender. American, Siberian, Globe and Hovey's Golden Arbor Vitæs appear to be well adapted to our soil, and are perfectly hardy. Chinese and the old Golden Arbor Vitæ are hardy in well sheltered locations, somewhat shaded.

"*American Holly.*—This beautiful shrub we are now testing. It stood last winter well in a shaded location, protected from the wind.

"*Mahoma Aquafolia.*—Our experience with this fine evergreen shrub is, that it is adapted to our soil, proves hardy in a location well sheltered from the winter sun and wind, and in well-drained and moist soil. Dwarf and Tree Box have proved hardy in a shaded location on the north side of a fence, where not exposed to sudden changes of temperature.

"Scotch Broom and Scotch Furze are barely hardy, even in well-sheltered locations; have not fully tested them; will keep in cold rooms in-doors.

"Golden and Silver-striped Japan Enonymus will prove hardy here, we suppose, with slight protection; now testing. This is a very beautiful, glossy-leafed evergreen shrub. Yucca Filamentoza and Flaccida are perfectly hardy, and grow luxuriantly. Y. Alœfolia, hardy if kept in pots in-doors during severe weather; will not stand more than thirty degrees of frost, if the roots are encased in frozen earth.

"With this we conclude our report for this year."

RANDOLPH COUNTY.

Hon. JOHN E. DETRICH, writes as follows:

"Last winter was rather mild, but Randolph county was in the latitude where it seemed inclined to linger too long 'in the lap of spring,' and encroach upon that season to dispense the usual amount of cold. Late spring frosts destroyed the *Peach* crop in this county. The prospect for a very full crop of that excellent fruit was good until about the middle of March. Severe frosts after that time killed nearly all the buds, except on some hardy seedling trees, on which just about enough fruit matured in a few localities to keep up the remembrance of how peaches taste, that fruit being a failure in this county for the last two seasons.

"The crop of *Apples* was considerably below an average, and winter apples are very scarce. Of summer and autumn varieties there was a moderate crop. As usual, in seasons of late spring frosts, the yield, in favorably situated orchards, protected by timber, was best.

"Observed no indications of bitter rot. Apples were rather more perfect than last season.

"Most varieties of *Small Fruits* grown in the county were abundant enough to supply the home demand, except *Cherries*, of which there was a small yield of the Morello on trees in favorable situations. Where much exposed the blossoms of that hardy variety dropped. The more choice varieties were an entire failure. The same may be said of *Plums*, except the common native red plum, which was more abundant than for several years previous.

"Very few *Strawberry* beds have been renewed since the plants were killed a few years ago."

"*Grapes* yielded below an average crop. The Concord and Clinton yielded the most fruit, but both varieties rotted more than usual. Virginia Seedling did well, but there are only a few small vineyards of that variety, and no large vineyards of any kind in the county.

"Not much advance has been made in fruit growing for several years. More apple than any other fruit trees have been planted. The trees seem to be in a healthy condition, and generally grew well, but it is questionable whether the yield of fruit compensates the labor expended. Cold north and northwest winds in the spring, and late frosts, are beyond the control of man, and are the greatest drawbacks to successful fruit growing in this section.

ST. CLAIR COUNTY.

Col. ADOLPH ENGELMANN, of Bacchi-Ara, near Shiloh, St. Clair county, gives the following raport:

"The mild weather in February, 1876, started vegetation, and on March 11 many peach buds had opened into blossoms, whilst other fruit buds were proportionately advanced. On the morning of March 12 there was snow and severe frost. Cold weather continued to the end of the month, culminating on the 21st in 7° F., being 25° below the freezing point. Only a few *late* peach *buds* survived. The Black-heart cherries were all killed. The Bigarreaus bore one-third of a crop, and only the Early Richmond bore a full crop. The Morellos were full of black spots and worms. Pears yielded about one-fourth of a crop. Apples, grapes and small fruits suffered less. What was spared by the cold was severely tasked by a very wet summer. This made sad havoc amongst all vineyards that had not a very dry situation. Rot took the growing crop, and several kinds of mold (fungi) destroyed the foliage to such an extent that many vines could not mature the bearing wood for next year's crop sufficiently to stand the cold of a common winter.

"Apples would have made a good crop, but for the ravages of the larvæ of the codling moth, which has increased in this county to such an extent that but few apples can be found which are not infested by one or more of these larvæ. The result is that most of the fruit drops prematurely, and what hangs to the trees will not keep. Since the codling moth some years ago made its appearance I have not heard many complaints of the bitter rot, which before that time was very prevalent. The bitter rot, however, still injures some varieties of apples. The last summer was also very severe on pear trees, which blighted worse than ever. Of my peach orchard of seven acres about half a dozen peaches were obtained. Of as many acres of apple trees I did not get fruit enough for family use. Of fifty pear trees, the survivors of an orchard of three acres, I got about one-fourth of a crop; the Beurre Ditremberg doing best.

"The summer of 1875, having been as wet as that of 1876, had also been severe on grape vines, the foliage of many varieties dropping early, and before the year's growth of wood had matured. Foreign varieties, Hybrids, Labruscas and Æstivalis, had all suffered, the first mentioned most. Riparia had escaped almost unscathed.

Individual vines of some varieties suffered more than others of the same variety. In November I laid down and covered all vines that had not fully matured their wood, or were considered tender.

"In spring my vines were all in good condition. Of many varieties I got some splendid specimens. Particularly fine were some Concords, Crevelings, Cunninghams and Rogers' Hybrids Nos. 4 and 9. Yet the Concords bore only two-thirds of a crop, the Nortons one-half a crop and the Taylor one-half a crop. The Catawbas were almost a failure. The Rogers' Hybrids set many heavy bunches, but did not mature them all, on account of the premature loss of their leaves. Of eighteen varieties of these Hybrids, the Salem did the worst. Allen's White Hybrid and the Autuchon were complete failures. Even the Cunningham, which bore a heavy crop, suffered from the loss of its leaves, its must only weighing 99 by Oechsle, whilst in common seasons it will average above 120, and in 1872 it weighed 140. The Cynthiana also did well, but its must, like that of all other grapes, was below the average of common seasons, being 93, Norton 97, Taylor 74, Catawba 76 and Concord about 68.

"I have again given winter protection to my tender vines, and found them all in a better condition than in the fall of 1875. My vineyard is on Shiloh ridge, the highest portion of our county, on an easy declivity to the south, and without doubt for this reason did better than most other vineyards. With many people, even the Concords were, during the last two years, a failure, and acres of vines have, in consequence, been dug out.

"Garden vegetables did remarkably well this year. The only difficulty was encountered in getting cabbage plants, a small black insect devouring them about as fast as they could be made to sprout; and in the fall the larvæ of the cabbage-moth did some damage. Tomatoes also, in the later part of the season, did not set as much fruit as was desirable.

"Prices of fruits and vegetables were all the year low, both at St. Louis and at Belleville, and paid but poorly for the cost of production and marketing, and fruit growers and market gardeners are all discouraged. A great many acres of land in this county are devoted to these two branches of horticulture, but the present prospect is that the area thus used will be considerably contracted, until better times and more favorable seasons again give encouragement to the horticulturist.

"Respectfully, A. E. ENGELMANN."

Hon. JAMES R. MILLER, of Collinsville, St. Clair county, near the Collinsville plantations of the McCormick, or Mammoth Cluster Raspberry, says:

"I have been out this morning, visiting some of the principal fruit-growers of this locality, and find that the acreage and yield are less for last year than an average of the raspberry. The causes of the decrease in acreage has been the effect of a peculiar green worm that for two years has made its appearance in great numbers, eating off the leaves as soon as they grew of sufficient size for them to feed on; and when the leaves are eaten off, the worms then attack the blossoms. The result is that the cane dies as soon as the dry weather sets in, and of course no fruit comes to perfection. Another cause for the decrease of acreage is the fact that many of the fields are now dying by reason of old age, as about ten years is the limit of the producing age.

"About six years ago, I suppose there were about one hundred and fifty acres of producing raspberries in this locality, while now I do not think there are more than from ninety to one hundred, and many of these acres are young vines re-planted on the old ground.

"The yield last year was not more than two-thirds of an average crop, but the price was fair.

"*Grapes* are neglected; many vineyards abandoned, and no new ones planted. In the *Peach* and *Apple*, much more planting has been done, especially as regards peach trees. One orchard of 1,000, one of 500, one of 200, and several of a less number,

have been planted during the last two years; and perhaps as many apple trees have been planted, but not in so large quantities by any individual. As a rule, more attention is being given to fruit culture now than ever before.

"I cannot give any definite information concerning the raspberry worm. As yet, no practical remedy has been found to prevent their destroying the vines, but they need to be looked after.

"The peculiarities of the weather of the past year have been, the warmth of the winter and the wetness of the summer. Premature development of buds was the result of the very mild winter, and rot of the moist atmosphere of summer. The stone fruits very generally perished in the bud. Pears, currants and gooseberries were, to a large extent, destroyed while in bloom. Some of the apples, the strawberry, raspberry, blackberry and grape, were more fortunate in this respect; but the apple and grape were much damaged by wet, and the consequent defoliation and rot. Altogether, it has been a year of unfruitfulness in many kinds of fruit, and of devastation and decay in others. Add to this low prices of fruits and the deterioration of trees, and the discouragement and gloom of the last few years is not diminished.

"But when we remember that our fruit-growers have no monopoly of the 'hard times,' but that these prevail throughout all branches of production, and even to some extent in trade and transportation, we do not feel like advising the fruit-grower to abandon his efforts. Of course, he will never make as large an average profit as the dealer, the transporter or the banker, unless, in common with the agricultural and other producing classes, he rises in intelligence and force of will, so far as to insist on radically different commercial and political relations to the world about him from those now spun around him by more cunning, powerful and unscrupulous men than he. But, as compared with the corn-grower, the wheat-grower and the cotton-grower, the fruit-grower is still getting on tolerably well. The ordinary farmer is getting but low wages for his labor, and small interest on his capital. The fruit-grower suffers in common with the farmer, and both, in common with all producers, are taxed heavily to maintain, if possible, ten per cent. dividends on the watered stock of railways; to sustain protection on manufacturers' patent rights on machines, and copyright on their reading—if they read. 'All wealth comes from the soil.' There are only $30,000,000,000 to be divided among 40,000,000 of people, which is $750 each. If Vanderbilt must have $7,500,000 of this wealth, then 9,999 people must live on what they earn from day to day, and have no more; and many thousands more must work to pay their share of his 'legal' interest. So, as fruit-growers, let us thank God that we are not as other clod-crushers, and that we give tithes of all we possess to the god Mammon, and so escape. But to return.

"In Southern Illinois, the marked feature of the season has been the prevalence of the so-called bitter rot. I have taken some pains to inquire after this disease of the apple, but must confess that my present information concerning it is vague and unsatisfactory. I have found no notice of it in any of the fruit books, except that of Dr. Warder, who quotes a description by H. N. Gillet, of Laurence county, Ohio, as follows:

"'The disease generally presents itself on the skin of the apple in very minute brown spots, from one to a dozen or more in number, generally after the fruit is pretty well grown. These gradually spread and penetrate the flesh of the apple, producing a black rot, almost as bitter as aloes; but this taste is confined to the discolored portion. The fruit ceases growing, and falls prematurely. The rot occasionally begins at the centre, and extends outwards, so that the fruit appears sound for some time.'

"I suppose this to be at least one of the forms of the disease known as bitter rot. Dr. Warder quotes another authority giving a somewhat different form; and in the monthly reports of the Department of Agriculture for April and May, 1874, Mr. Taylor describes some apples received from Arkansas, where the disease may have been of a kindred character, but is attributed to a special lack of needed constituents in the growth—a cause not much suggested as yet.

"Whatever the true characteristics of the disease, it seems to have a place and name for many years. A correspondent from Crawford county, in this State, wrote to the editor of the *Prairie Farmer*, asking him to check it, thirty years ago, and his

letter, and the editor's advice to thin out the limbs, may be found on the first page of the number for October, 1846. At that time, apples were hauled by wagon from Crawford county to Chicago, and it was desirable to have them sound when they arrived there.

"I have heard of the bitter rot occasionally for many years, especially in Southern Illinois and Missouri. My impression is, that I have rarely or never heard of it north of 40° latitude, and that usually it is more than a degree farther south. I have always, so far as I remember, found it only in the Mississippi Valley. This would tend to show, if I am correct, that we must seek in the climatic and other conditions of the lower valley of the Mississippi for the conditions of the disease.

"These favorable conditions, so far as I have observed them or obtained the experience of others, are excess of moisture, or rather long-continued moisture, especially when the temperature is high, and probably decaying or diseased trees. Prof. Turner, many years ago, in a paper before this Society, mentioned incidentally that a Baldwin apple tree, on which the fruit rotted prematurely, was found, on cutting it down, to be thoroughly rotten at heart. In Clay county, I was told by one person that heavily pruned trees had been more liable to the disease. Old trees seem more liable to the disease than young. Dr. Horton, it will be noticed, intimates that some element of plant-growth may be deficient in the soil. But the prime incentive is, I have no doubt, wet weather in the growing seasons. Once 'located,' however, Mr. Pullen is convinced that it remains to plague future generations of apples, and this, in the nature of the case, would be probable.

"Some varieties seem to have been much more affected than others. The Willow Twig, the Rambo and the Rawles' Janet are among those most complained of. The Smith's Cider, Ben Davis and Wine Sap were among those most free of disease.

"The cure or prevention of the disease, in future, is a difficult question. There is some reason to suppose that bitter rot is only an intensified or virulent form of common rot, and will disappear in many places with the return of ordinary conditions. On the other hand, in some localities it has assumed apparently a permanent type, and continues, year after year, to destroy the hope of the orchardist. In either case, however, the prevention and cure would be the same, though less important if the disease is temporary. Wide planting, and the consequent good ventilation, would suggest itself in planting new orchards, in moist climates. The clearing away of diseased fruit from an affected orchard, by hand, or by pasturing hogs in it, seems to tend to check the disease. The use of ashes, salt, lime, etc., as manures, appears to have a good effect.

"But, upon the whole, I conclude that the disease is insufficiently known, and should be more studied, and I would recommend that a special committee be appointed to secure the co-operation of Prof. Burrill, of our Industrial University, and Mr. Taylor, of the Department of Agriculture, and make examination and report upon this subject."

Mrs. L. S. Taylor sent in a report on the subject of Botany, which was read by the Secretary, but the limit of pages for our book (350) compels us to omit this and some other papers and discussions, that we would otherwise gladly publish.

DISCUSSION ON THE SUBJECT OF BOTANY.

Hon. W. C. Flagg (of Moro) inquired: "What can we do to render the study of Botany popular?" He was inclined to believe that the study should commence with children, and not be put off and off, and finally find a place only among "high school" studies. He had succeeded in interesting children in the study of plants, but he found the difficulties considerable. Children may be interested, but the teachers are not plenty

who can make the lesson attractive. We send our children to school. They study grammar, and geography, and history, and figures; but the natural sciences are neglected. In fact, we find active opposition whenever we attempt to introduce natural science into the public schools. The greatest difficulty we have to overcome, it seems to me, is the conservatism of the times. It seems unaccountable that there should be a dislike and popular prejudice against introducing studies pertaining to natural science, when their practical importance is so apparent. What is the best thing to do under the circumstances? If any one knows how to overcome the difficulty, I would be much pleased to hear him explain how it is to be done.

MR. MCWHORTER (of Aledo) said: We must take time to wear away the popular prejudices against the subject.

MR. FLAGG—That is, do away with the "old one." [Laughter.]

MR. MCWHORTER—That's it.

MR. CHILD—I have discovered that a teacher can awaken a great deal of interest by using plants and flowers as an object lesson. Let the pupils bring into the school room the leaves of a plant and they cannot fail to become interested in the practical study of it. The child begins by learning the names of plants, then their parts and characteristics; and an interest in this way will be awakened that will never die out.

PROF. WORTHEN said that the first thing to do, in regard to this question, was to qualify our teachers, and so instruct them that they cannot fail to create an interest in the minds of all pupils who come under their instruction. There is nothing that the child will be so quick to learn as this subject of Botany, where the right methods are used, and instruction is intelligently given, with the object of the lesson before the pupils.

MR. DENNIS—I know a teacher who in the spring time takes a walk with her pupils once a week for the purpose of studying botanical subjects; and she succeeds admirably in interesting her pupils and giving them substantial knowledge. I think the plan is excellent.

MR. MCWHORTER said that a successful teacher must not only be qualified to teach, but he must be able to convince the parents and neighborhood of his qualifications by the interest which he excites and maintains in his pupils.

MR. GASTON said: The way was for the teacher to teach the child, and the child to teach the parent. He said that he was now taking lessons from his boy, but eight years old.

Father Shepherd said that it was his fortune to be thrown in early life upon the verge of civilization, where there were not the opportunities which we now have for education; and, knowing the importance of these things, he had endeavored to help build up schools and colleges where these branches of natural science might be studied. He would soon step into the grave, but work done in this direction would *live*. His working days were about over; he had lived about the allotted time of man's life. He gave us his benediction and good-will. "I hope," he said, in closing, "you will accept my good wishes for your welfare."

Why ignorance prevails—the real *why* for the prevailing ignorance of and the popular aversion to this subject of Botany—is this:

1. It is *intentional ignorance*. We mean to give natural science studies the go-by, that we may have more time to cram the mind with abstractions and "dead languages." A boy will commence the study of grammar and Latin at the age of ten years; his elements of Botany and Zoology and Geology are shoved away up into the high school or college studies. The pupil is taught to believe that these are incomprehensible to him as a child.

2. The second reason is, it is the fault in our educational system. Those who have arranged our curriculem of study did not sufficiently consider the *relative* values of "knowledges." We clothe the minds of our children as we clothe their bodies, in the prevailing fashion. We do not wisely consider the things that concern us most to know. Our boys must have a smattering of Latin and Greek, not that they may read the great authors in the original—they can't read their diplomas on commencement day—but that they may appear in the role of educated gentlemen. Our daughters must study French and Italian, not for any useful purpose, but because they would be ashamed to own the fact that they were in ignorance of these things. Knowledge that brings applause is made to predominate over knowledge that aids the arts in life. It is, therefore, a vice in our educational system that fails to put that first which comes first—that first which concerns us most to know.

A third cause of the unpopularity of the study of Botany is the technical terms. As Prof. McAfee said, common people, boasting only of common sense, can hardly see why "aculeate" is better than "prickly," or why "adsurgent" is better than "ascending," or "alabastrum" is better than "flower buds;" and was he not right when he affirmed boldly that "technicalities in any science or art are a direct bar to the aquisition of knowledge?" In fact, one chief object in investigating these terms

and applying them was "to conceal material facts from the masses," and make the acquisition of knowledge difficult, and thus "secure to experts and scientists a sort of royalty" on knowledge.

The day has come when authors of text-books are eliminating more and more these excrescences upon this useful science. Botany will be a popular science, said Prof. H. H. McAfee, on one occasion, in our annual horticultural gatherings, when we "rid it as much as possible of all the unfamiliar, unnecessary technical terms which it is possible to dispense with; and even then, in the nomenclature (which of course could not be changed) we would have enough to task the memory."

Mr. Flagg offered the following resolution:

Resolved, that the Executive Committee of this Sociuty be instructed to memorialize Congress, urging the restoration of the single rate on all third-class matter.

After brief discussion and explanations the motion was carried.

Letters were read from G. B. Brackett, President of the Iowa State Horticultural Society, requesting that delegates be appointed to attend their annual meeting in January. Delegates appointed.

Letter read from Mr. W. H. Ragan, President of Indiana State Horticultural Society, sending cordial greeting.

ON VINEYARD CULTURE.

O. L. Barler reported on Vineyard Culture, reading an essay, which was followed by discussion. But as nothing especially new was brought out, and for want of space, the report and discussion are omitted.

REPORT OF COMMITTEE ON FRUITS.

Your committee found upon the tables a very fine collection of the more valuable of the winter apples of our State, together with a few winter pears.

The specimens of each variety were larger than usual, some of them very large, but showing the dull and clouded condition, as to color, so usual the past season. Notably, some specimens of the Ben Davis and Willow Twig, from Hamilton county, were very large, handsome, and with high, bright color, proving it, as has long been known, to be one of the finest apple regions of the State.

We find on the tables, from the same county, a seedling originating in Hamilton county, an apple named by the Warsaw Horticultural Society "Wythe," which was brought to the notice of this Society some years ago by our now worthy President. Your committee, some of whom have seen this apple year after year on our tables, have come to the conclusion

that in it we see one of the great apples of the future. The fruit is the size of the well-known Ben Davis, and of the same keeping qualities. This apple is very different in character from any of our well-known late-keeping apples, they being nearly every one of a mild sub-acid flavor, while the Wythe is very juicy, with a *brisk* sub-acid flavor, making it a most excellent culinary fruit, and its acidity will make it very refreshing, healthful and desirable as an eating apple in the early spring, when the human system is in such great need of the healthful fruit acids. Your committee would recommend this apple for general dissemination.

Two apples presented by H. C. Graves, of Sandwich, Illinois, supposed to be seedlings, may prove of value.

The Grimes' Golden shown are very large and fine specimens of that variety. Its ripeness at this time indicates that it will not prove to be the long keeper that it has been claimed to be. This is a fine apple in quality, the tree an abundant bearer, but unfortunately the fruit *all* drops from the trees before gathering time.

The exhibition of winter apples by the Warsaw Horticultural Society is very fine, and well worthy of the national reputation of this region for the growing of fine fruits. There were many very fine specimens of our well-known leading winter sorts, but the committee could not find out the names of the exhibitors.

Pears.—Although the past ten years have been very destructive to pear trees in this State, and the past season has been a very poor one in which to grow good pears, we find on the tables some very fine specimens of winter pears. Notably, those presented by D. F. Kinney, of Rock Island, who shows Josephine de Amiline, though not of extra size, well ripened and of excellent flavor. Also, very fine winter Nelis, Beurre Easter and Beurre d'Anjou.

We find on the tables a pear sent here through the *Prairie Farmer*, by Mr. L. Adams, of Peoria county, accompanied by the following statement:

"The tree is thirty-five years old. The seed was planted by A. Wilkinson. Said tree, this year, bore forty bushels, which mostly sold at three dollars per bushel. It last year bore thirty bushels, mostly sold at four dollars per bushel, making the tree, in the last two years, worth $240. If there is any other pear tree in Illinois, or any other place, that beats this, let us hear from the owner. The tree has proved itself to be as hardy as an oak. The great beauty of this pear is that it keeps until spring, the same as a winter apple, and will have a great commercial value in it. I have owned my farm for the last twelve years, and have had a fair crop each year. Persons not believing my statements are invited to call and see my tree in bearing. DENIS NELSON."

This tree has been known by the chairman of your committee for the past four seasons; he has seen the fruit, and knows that the facts as given above, at least during this period, are substantially true; and as this tree was grown from the seed where it stands, on the average prairie soil of your State, we can see no reason why it may not do as well all over the central part of our State at least. The young trees propagated from it have proven entirely hardy and good growers. It is proposed to name it Wilkinson's Winter, after the planter of the seed. The committee find the specimens of large size, fine golden color, and *very* good in quality.

Siberian Crabs.—We found one beautiful winter crab on the tables. Also, specimens of Whitney's No. 20, modeled in wax, artistically and naturally colored.

Some very fine specimens of apple trees of two years' growth were shown, proving that if there are no great extremes of cold this winter planters will have no trouble in finding good stock to plant next spring.

The hedge plants, seedlings, and evergreen seedlings, also show this class of stock for spring planting to be of the best quality.

An Apple from O. B. Galusha.—We find on the tables an apple labeled "Triumph," with the following notes concerning it:

"FOR THE COMMITTEE ON FRUIT.

"In introducing to your notice the 'Triumph' apple, I would say 'Squire Ridings, the originator, is well known to me as in every way a reliable man. He has one of the best orchards in the county, containing the varieties in best repute in our Society; and he says unhesitatingly that he thinks the 'Triumph,' all things considered, decidedly and *much* the best apple he knows. He says positively that it is a seedling. He has quite a number of other good seedlings, which he has preserved from a lot of seedlings which he grew, but none except this superior to other sorts in cultivation.

"As I have said, there is little chance to start in propagating it this year, but I will use my best endeavors to produce cions, and, if life is spared, will distribute buds among members of this Society as soon as can be; for there is no design to *speculate* on this sort, but rather to disseminate it for the good of the Society and State, should it prove to be as valuable as it now promises.

"As to the hardiness of the tree, I would say that the original tree seems hardy. Several years since I grafted seven rood grafts from it, four of which, when of proper size, Mr. R. planted as re-sets in his orchard, and they are doing pretty well. The other three also stood the hard winter and drouths well, and although almost destroyed by rabbits a year ago, which stopped their growth, yet they seem otherwise healthy.

"O. B. GALUSHA."

"MORRIS, GRUNDY CO., ILL., December, 1876.

"PRESIDENT HAMMOND: I send you a few specimens of the 'Triumph,' a seedling of seeming great promise, grown from seed planted by J. W. Ridings, Esq., of Morris, Ill. The tree bears uniformly and very well. The fruit is very *even* in size. I never saw crops as much so. All are about the size of samples sent. The fruit, as you can see by testing, by baking or otherwise, as it is too early to judge correctly of so late a keeper by eating in raw state, is of good quality and *keeps well* until May or *June*; in fact, has been kept till the ripening of Early Harvest and Car. Red June. There have been as yet no trees propagated from it. The tree has had a poor chance—standing in a row of Morello cherry trees, which have crowded it and thus prevented healthy development. These cherries are now cleared away, and I trust a growth will be made next year which will give cions for propagation. I saw the fruit three years ago, and had I not suspended horticultural work at that time would probably have propagated it before this. I hope the Committee on Fruit will examine it carefully.

"Yours truly, O. B. GALUSHA."

The committee find this an apple of very good size and shape, in quality good, very similar to that of the Stark, now quite ripe, but with the appearance of keeping for some time yet. It is somewhat lacking in brightness of color, which will be against it as a popular market fruit. Your committee are inclined to consider it an apple of great promise.

D. B. WIER,
J. R. TULL,
D. F. KINNEY.

Mr. Samuel Edwards (of Mendota) presented the following report on the subject of Arboriculture:

REPORT OF COMMITTEE ON ARBORICULTURE.

Mr. President and Fellow Members of the Illinois State Horticultural Society:

Having on several previous occasions served on this committee, the following brief paper is prepared, not so much with a view of giving light on the subject, as compliance with the scriptural injunction to give "line upon line, precept upon precept, here a little and there a little."

Tree planting on our prairies is very gradually on the increase. It is a work which, to the casual observer, makes but little show from year to year, but looking back to 1841 it is remembered that then only a few young orchards and very rarely a locust grove were noticed in this region, a striking contrast with what we now see very generally.

For several years the locust used to be *the* timber tree, and was quite extensively planted, and when the beautiful groves, on which so many had placed their dependence for future fencings, were destroyed by the borer, a general depression came over the minds of tree planters. For a time their energies for work in this direction were paralyzed, and it is only recently, from observation of the growth and value of a few other varieties of trees as yet successfully cultivated here, confidence in timber growing is being restored. Many have made small beginnings; a few are planting extensively of black walnut, European larch, ash of different varieties, white and Scotch pines, white willow, silver maple and ash-leafed maple, all of which give good satisfaction, except the silver maple, which is in some cases troubled with a borer, and limbs are broken in severe storms.

Some have advocated extensive planting of the chestnut, and for over twenty years they were thrifty on a prairie mound, clay soil, with good natural under-drainage, in my grounds. A severe winter succeeding a drouth fatally injured one of the two trees set in 1851; and on my new grounds at Mendota, only some four feet to a stiff clay, they are very unsatisfactory; many trees four to six feet high were killed in the winter of 1874–5.

The tulip tree, for twenty-five years from first planting, grew finely. Quite a number on the grounds of Arthur Bryant and Tracy Reeve, at Princeton, and at "The Evergreens," LaMoille, failed under the same circumstances as the chestnut.

The English walnuts grown at LaPorte, Indiana, were brought to one of the meetings of this Society, a few years since, by W. H. Ragan, with the report that it proved hardy and had borne fruit there several years. I tried a second hundred from an Eastern nursery; they have all winter-killed. Doubtless all of these varieties, planted on timber soil in the southern and central parts of the State, will succeed.

It is evident, from past experience, that it requires several years to test varieties of trees before planting extensively on the prairies of our section of country.

A good beginning is being made in planting trees along public highways, for which white elm, ash and silver maple are generally used. It is to be regretted that some continue to plant the Lombardy poplar, which is very short lived and timber of so little value. Centennial trees were very generally set by our people who plant at all.

Several cemeteries, a number of farms in this vicinity, and the Blackstone Public School grounds, in Mendota, have been improved the present year by planting extensive evergreen screens.

How any one can reside on our bleak prairies during the passage of one of our polar waves, like this of December 9th, with the mercury at 23 degrees below zero, and not decide to provide timber shelter for his family and animals, is past my comprehension. Yet how many men, with good sense in every other respect, and with ample means, continue to live without this merciful provision. It really does seem certain that, at no distant day, a general awakening to this work of necessity must break out all over the prairies of the Northwest.

Of ornamental deciduous trees, as yet have planted only to a limited extent. I would place first on the list our lovely sugar maple. If there is a finer avenue of deciduous trees in our State than the one of sugar maple planted by Arthur Bryant some forty years since, it has not been my good fortune to see it. Norway maple is one of the best, valuable on account of retaining its foliage late; cut-leafed weeping birch, very fine; weeping mountain ash; horse chestnut, slow grower, desirable; Japan ginko, unique; American linden, if foreign, would be often called for; magnolia acuminata, unsurpassed. The following do not endure severe winters: European ash, and several weeping varieties of it; European weeping linden; weeping thorn, several varieties; rosemary-leafed weeping willow; Kilmarnock weeping willow, though hardier than the foregoing, is frequently injured enough to render it undesirable.

REPORT ON ARBORICULTURE BY J. T. STEWART, M. D., OF PEORIA, ILL.

Mr. President, Ladies and Gentlemen:

In treating the subject of Arboriculture, we will first consider ornamental and secondly useful arboriculture, or the culture of trees for timber and for modifying climate. I use these terms in their ordinary, not in their proper sense. A thing that is useful may, or may not, be ornamental, but a thing that is really ornamental is always useful. Whatever cultivates and refines the taste of a people, elevates that people.

In the early settling of this and all other countries, the first consideration was the necessities of life. These we have not only acquired, but we have accumulated wealth. Now it is eminently proper to give the ornamental a share of our attention. We as a Society cannot ignore it, and fulfill our mission. We cannot wait for the people to urge us forward; we must urge, lead and direct them.

The cultivation of our farms is brought to a good degree of perfection; our barns are filled with plenty; our orchards, vineyards and gardens

are laden with fruit; our stock is improved by importations from all parts of the world; our houses are beginning to show a higher order of architecture, and the skill of finished workmen. But our yards and lawns are too often neglected, cheerless and bare; our parks are few and far between; our roads are left without a tree on either side to please the eye, to protect us from the burning sun of summer or the fierce winds of winter.

This is all wrong. We have in all parts of Illinois trees and shrubs that are adapted to the soil and climate; trees and shrubs that are ornamental and useful. We have only to go to the forest and get them, and with a little judgment and care in their selection and planting we can add much to the beauty and comfort of our homes. An ordinary house surrounded by nicely kept lawns, trees and shrubs, is more attractive, cheerful and home-like than a fine house without them.

I can indicate only in a general way the trees and shrubs that are most suitable for this purpose in Northern and Southern Illinois, but for Middle Illinois I can be more specific. One general rule applies equally to all places. That is, indigenous trees are more reliable than foreign ones. There are exceptions to this rule, but the exceptions are comparatively few. Some trees prefer wet, some dry soil, some sandy; some prefer sheltered, some exposed places. A few will flourish in any soil, or on any exposure, the majority will not. To insure success in the cultivation of trees and shrubbery, all these things must be taken into consideration, and each one placed as nearly as possible in its natural habitat. I am aware that a theory has been adopted and advocated recently, by pretty good authority, that plants, including trees, may do better in entirely different soil and surroundings than that in which they are found in nature. This is undoubtedly true of some plants, but I still think they are the exceptions and not the rule. Most trees and shrubs that are healthy and vigorous are handsome, but a sickly tree or shrub, no matter how elegant the species may be to which it belongs, is unsightly and should be removed.

Among the indigenous trees of Middle Illinois that are suitable for our purpose may be named the hard or sugar maple, the soft or silver-leaf maple, the box elder, the hackberry, the linn, the ash (five species), the coffee-nut, wild black cherry, persimmon, pecan, honey locust, sycamore, black walnut, red cedar, and, in Southern Illinois, the tulip tree.

Of those that are not indigenous, we can recommend the European elm and linn, the Norway maple, birch, hemlock, larch, Norway and Scotch pine, mountain ash, catalpa white willow, horse-chestnut, and Norway spruce. Among the indigenous shrubs of Middle Illinois that are worthy of cultivation for ornament I would call attention to the June berry, shad bush or service berry (*Amalanchier canadensis*), red bud, wahoo sumac, aromatic sumac, black and red haw, bladdernut (*Staphalea tripolia*), red osier dogwood (*Carnus stolonifere*), the alternate-leafed cornus (*Cornus alternifolia*), and in Southern Illinois the flowering dogwood (*Cornus florida*), and the Indian currant (*Symphoricarpus vulgaris*).

Of our vines, the Virginia creeper (*Ampleopris quinquifolia*), the trumpet creeper (*Tecoma radicans*), the wild grape vine, the moonseed or

yellow nerrilla (*Menispermum canidensis*), virgin's bower (*Clematis virginica*), wild false bittersweet (*Celastrus scandens*), and the wild yam (*Vioscurea villosa*).

Vines are my favorites. No grounds are complete without them. There is a peculiar grace and beauty, a charm about vines which pertains to nothing else. They are the poetry of the forest, the emblem of affection, the companion of love. Nature has given us liberally of them. She never plants a park without interspersing it with vines. Let us not overlook or neglect this, her crowning beauty.

There are other trees, shrubs and vines that are worthy of cultivation for ornament, especially in Northern and Southern Illinois, but these are among the most prominent and valuable ones in the middle portion of the State. I will not occupy your time with a description of them, as that can be obtained from any of our text-books on Botany.

For planting, training and handling ornamental trees, and for other information on the subject, I refer you to a valuable and well-written article by Mr. J. H. Garrison, of Greenwood, McHenry county, that was published in last year's Transactions of this Society, page 366.

There are different views on the subject of tree planting on road-sides, some contending that all our roads should be lined on either side with trees, and others that they should not. I think both are right and both are wrong. If all road-sides were set in trees, it would undoubtedly add immeasurably to the beauty of our country and the pleasure of traveling; but other things must be taken into consideration. In some flat districts, where the mud becomes deep and is long in drying, the shade of the trees would materially retard the drying of the roads, and thus impede travel. This would be a serious detriment to farmers in carrying their produce to market. Again, in case of small farms with roads passing through them, the injury to crops on the side of these rows of trees might be seriously felt. And where roads pass through farms in the vicinity of large forests, where there is already a full fourth of the area of the region round about in timber, they may give no adequate compensation for the loss, or partial loss, of the land adjacent to them. But in all places where roads pass through large prairie farms that are reasonably well drained (and if they are not they should be), in all places where they pass through waste land, these objections do not exist.

Besides the beauty they give to the country and the pleasure they impart to those who travel on these roads, they are very useful. The protection they give a farm is more than most people estimate, usually more than compensates for the loss of land they induce. In pasture lands, the protection they give to stock in winter and the grateful shade in summer are no mean considerations. And the wood they make will be an item of great value to the next generation. Ordinarily, a farm with its road-sides lined with trees is enhanced in value, and will sell more readily and for a higher price than one that is not.

As to the kind of trees that are most suitable for road-side planting, many circumstances must be taken into account. In the large prairies, where it is desirable to have a speedy growth to make screens and wood

as quickly as possible, the soft maple, or even cottonwood, may be recommended, though the latter I would not ordinarily recommend. The box elder is a good little tree for this purpose; it is clean and handsome, and, in moist rich land, is a reasonably fast grower. Where rapidity of growth is not an object, and land is valuable, the white oak is the best; it grows slowly, throws its roots deep, taking no nourishment from the surface, where farm products derive all their nourishment, and eventually makes the best of timber. The tap root of an oak has been known to penetrate as far below the surface as the tree rises above it. The roots, though much deeper, extend as far around as those of most other trees.

The black walnut is a good grower, and easily cultivated, but it monopolizes much land. Few things, even trees, will grow near it. It absorbs the nutriment of the surface for a long distance around, and I think exhales an emanation that is somewhat poisonous to other vegetation. Possibly the leaves contain ingredients that are injurious to the soil, though most leaves enrich it; yet, on account of its superior timber, easy culture, and many other good qualities, where land is plenty it is one of the first to be recommended.

The ash trees are valuable for this purpose. They are thrifty growers, clean, make excellent wood, and interfere little with the growth of vegetables, grass or grain. The hard maple—one of our most valuable trees—is suitable for all places where there is a clay subsoil. The willow, of course, comes in where the soil is too wet for other trees. For a simple shade tree, the white elm has no superior in our forests. The shell bark hickory and the pecan may be recommended. The hackberry is a fine tree, and will grow in the most exposed places. The linn makes a good growth, and is an ornamental tree. There are others that may do equally well, but those we have named are among the best known and most suitable for road-side planting.

To adopt and carry out any efficient measures for the protection and extension of our forests for timber, and for modifying climate, requires the aid of government. It must at least be encouraged by legislation. And here the great difficulty lies in harmonizing the right of the State and the land-holder. It is not like most other things, that may be left wholly to the option of the land-owners. It is not like trade and business generally, that is governed by the law of supply and demand. The earth is for *man*—not for one generation. One generation has no moral right to denude the earth of its forests, and leave it to the next naked and bare, because it will not pay six or ten per cent. interest on the money invested in planting trees. The government should have and exercise the right to place some restrictions on the indiscriminate destruction of forests, and should make some substantial provisions for planting more. We cannot now do much more than call attention to the importance of the subject and the necessity for action. It is folly to say that the present reckless destruction of timber in this country will not be followed by serious consequences in the near future. If any one thinks so, a little investigation into the present condition of Europe will undeceive him. What was done in Europe during several centuries will be done here in less than

one. This generation will not pass till the pine forests of the North will be exhausted. This generation will not pass till nearly all the valuable timber of New York, Michigan, Ohio, Indiana, Illinois, Iowa, Wisconsin and Minnesota, will be exhausted.

Timber will not grow at railroad speed. From fifty to a hundred and fifty years are required to make timber that is valuable for lumber and building purposes generally. The planting of timber on a large scale throughout the country should be begun now, to supply the demand that is inevitable before it will grow to maturity. There is much waste land that is the best for this purpose; and on the broad prairies, where there is no waste land, a portion of every farm should be converted into forest.

The requirements of civilization are altogether different from that of savage life. A man alone in the wilderness is monarch of all he surveys. But if another comes into this wilderness, he also has rights which must be respected. When a country becomes settled, and a people become a nation, with laws necessary to regulate and maintain their existence, and they attain to any degree of civilization, the lakes and rivers are regarded and held as common property for the good of the whole. The individual rights to catch fish in those lakes and rivers are abridged for the benefit of all, and the government very properly lends its aid for replenishing them. The government prohibits men from indiscriminately slaughtering game that may be found upon their own land. The forests are a thousand times more a national benefit than these, and should be protected. Individuals should not be permitted to have and to exercise rights that will injure the whole people and coming generations. The only reason why this is suffered is because the national benefits of forests are not known and the baneful effects of their destruction are not realized.

Make it known to the people that with our rapidly increasing population we are surely marching on to the destruction of our forests, and let them know and realize what the consequences will be, and how speedily they will follow, the people, being the sovereigns, will devise some means to arrest it. They will devise some way to keep a due proportion of land in forest; so much as is necessary to secure the rain that is required to mature the crops; so much as is necessary to prevent destructive drouths and equally destructive floods and inundations; so much as is necessary to temper and moderate the harsh cold winds that will destroy our fruit and render our climate disagreeable and unhealthy. The importance to the whole people of putting and maintaining a due proportion of the area of this country in forest can scarcely be estimated. It affects every interest of the country. And a failure to do so will result in greater disaster than would the stopping of the navigation of all its rivers and lakes.

The drouths of Western Iowa, Dakota, Nebraska, Kansas and Colorado are caused chiefly by want of timber. The winds that sweep over those plains have nothing to obstruct them in their course. If a due proportion of that country was planted in forest, in twenty years the drouths would cease and the wind would be greatly moderated.

We in Illinois have not suffered materially from change of climate in consequence of the clearing of our forest land, for the reason that since the prairie fires have been stopped young timber has grown upon a considerable area of country, and a thick growth of young timber is almost as valuable for this purpose as the old. But this will not continue. The area of cultivated land is rapidly increasing. The farms are extending into the forests faster than the forests are extending into the prairies. In fact, there is not much more prairie for them to extend over. If this process continues, its effects will soon be felt. It will make colder winters and hotter summers, greater drouths and greater floods, higher winds and more variable temperature. It will have a blighting effect upon fruit, and will be injurious to crops generally. It will do infinitely more harm to fruit trees than do all the insects that now infest them. The great fault of our climate now is its extremes and its changeableness. Its extremes will then be greater and the changes more sudden and frequent. Many of our people now have to leave and seek a more equable climate or suffer from disease; then more will have to leave or die.

I now suggest the propriety of this Society appointing a committee to mature some plan for the protection of forests, and the encouragement of forest culture, in Illinois, and present, or have it presented, to our Legislature, setting forth the importance of the subject, and urging upon that honorable body the necessity for its favorable consideration.

With a few general remarks on forest culture proper, I will close. Our chief dependence are indigenous trees. A few foreign ones do well, but they are the exceptions. It is easier to acclimate a northern than a southern tree. To make the most timber (fully matured) to the acre, several species should be mingled together. A piece of land planted in one variety is liable to become impoverished, and many of the trees die while young, for want of a sufficient supply of the peculiar nourishment that species requires. The same soil may furnish abundant nutriment for a heavy growth of mixed timber, when it could not sustain an equal growth of any one kind. Some regard must be paid to the natural habitat of the species. Radical changes in this respect are dangerous. One principle is well established in farming, that is, the necessity of rotation in crops. One kind of grain or grass planted continuously on the same land year after year exhausts it, and renders a change necessary, or rather, exhausts the material necessary to develop and mature that particular kind of grain or grass. The same principle applies to forest culture. The principle of rotation in forests has always been observed by nature the world over. Of course these rotations in forests involve a long series of years, but it is no less a fact. Any species of trees that monopolizes a section of country, sooner or later exhausts the material that is necessary to sustain it, dies and is succeeded by another. It has been proved in Europe, by actual experiments, that it is impossible to renew old forests with the same kind of timber, until after centuries have elapsed. I have seen in this State large sections of oak forests die, and I believe from this very cause. In these instances it would be folly to attempt to renew them with the same kind of timber.

I doubt much whether the pine forests of Wisconsin and Minnesota that are now being cut off can be renewed for three or four centuries to come, but they can be replaced with the oak and other valuable timber, and ought to be. On our prairies, where there have been no forests for thousands of years, if ever, it is virgin soil for all species. Here the most urgent demand is to make wood as quickly as possible for present use, though it be of an inferior quality, and to cover as great an area as possible, for its climatic influence. For this purpose the softer woods of rapid growth that are known to be hardy should be selected. To show how quickly wood of this character may be produced on our prairies, I append an extract from a letter just received from my brother, S. W. Stewart, of Granville, Putnam county, Illinois. The kind he refers to is the soft maple. He says:

"The first seed was planted eighteen years last spring. I transplanted some sprouts from the river bottom two years later, which would make them all about the same age. There are 172 rods in trees, being a trifle over an acre. There are now upon this ground 775 trees. I planted the seed in nursery, and transplanted at one year old, in rows six feet apart, and about three feet in the row. I thinned out one-half as they grew large enough for fence poles. They were set too thick, and have not been thinned enough, consequently some have died and the rest are rather slender.

"They are in two groves; one of 115 trees I set ten by twelve feet; they have not produced so much timber to the acre, but the trees are a little larger. The trees in the thin and thick groves are about the same height—about fifty feet. Those in the thick grove average about twenty inches in circumference, those in the thin one about twenty-four inches, four feet above the ground, and some few measure three feet. I think twenty trees will make a cord of wood, am sure twenty-five will; I am inclined to think that twenty will make more than a cord. I think there are now forty cords to the acre.

"If I were going to start a grove now, I would plant the seed in a nursery as soon as they fall from the trees. They should be planted shallow, about one and a half to two inches deep. Transplant them when one year old, in rows nine feet apart, and three feet in the row. Cultivate well for three or four years, with a row of potatoes or some other vegetables between each row of trees. Thin as they need it until two-thirds are removed, then you have them nine feet each way. This thinning will produce more than enough wood to pay all the expense of cultivation. It makes good firewood, and most excellent poles for fencing, if cut when the bark will peel.

"I think black walnut is a profitable tree to cultivate. What a grand thing it would be if every 166 acres of our prairie had on it ten acres of forest."

Adjourned.

THURSDAY EVENING.

The Society adjourned from the hall to the Universalist Church for the evening session.

PRESIDENT HAMMOND called the meeting to order.

The following reports of committees were received :

OBITUARY NOTICES.

In the providence of God we are called to mourn over the death of Jona. Huggins (late Treasurer of the State Horticultural Society), Woodburn, Illinois.

Resolved, That in his death horticulture has lost one of its ablest workers, and this Society one of its oldest and best supporters.

Resolved, That we tender the bereaved family our sympathy in their great trial.

Another old-time horticulturist has laid his armor down. C. D. Bragdon, editor of the *Rural New Yorker*, and former editor of the *Prairie Farmer*, died recently in Florida.

Resolved, That while we lament our loss, we extend our deepest sympathy to his bereaved family and friends.

G. V. Grover (of Warsaw) is another one of nature's noblemen, and a most prominent horticulturist, who has died since our last meeting.

Resolved, That while we mourn we will endeavor to emulate his virtues, and be ready, when the time of our departure comes.

Resolved, That we tender the bereaved family our heartfelt sympathy.

Dr. LeBaron, State Entomologist, has died since our last meeting.

Resolved, That we recognize in him a most zealous and faithful worker in his field of labor, and we deeply lament what seems an untimely death. We tender the afflicted family our sympathy.

THE COMMITTEE ON FINAL RESOLUTIONS

Present the following report :

Resolved, First, That the thanks of this Society are due to the President, and all other officers of this Society, for the able and efficient discharge of the duties devolving upon them in their official capacity, whereby our work has been greatly facilitated ; and especially are our thanks due to our late Secretary, O. B. Galusha, for the faithful and conscientious manner in which he has discharged his laborious duties through a period of years.

Second, That the thanks of this Society are due, and are gratefully tendered to the Galesburg Horticultural Society, for providing such comfortable and convenient places for our meeting, and for the entertainment of our members, and to the citizens of Galesburg generally, for the generous hospitality extended to us during the present meeting, and to the several hotels for a reduction in their rates.

Third, That the thanks of this Society be given to the following railroads for the reduction of rates: Chicago, Burlington & Quincy, Illinois Central, Chicago & Alton, St. Louis, Rock Island & Chicago, Toledo, Peoria & Warsaw, Peoria & Rock Island, Chicago, Rock Island & Pacific, and Indianapolis, Bloomington & Western.

Respectfully submitted.

H. K. VICKROY,
WM. A. NOURSE,
A. H. WORTHEN.

ADDRESS OF THE HON. W. C. FLAGG.

The prominent feature of the evening was the very thorough and able address of the Hon. W. C. Flagg, of Moro, Ill., as follows:

Fellow Members:

We have gathered here to-night for the purpose of commemorating the twentieth anniversary of the organization of our Society. One-fifth of a century is but a brief period in the history of the human race. It is hardly an appreciable quantity in the duration of life upon the earth. But it is a wide chasm in the life of each one of us. These years have made men and women of the children that played about our firesides, and brought wrinkles and gray hairs to the comely brows of youth. They have brought age and weakness to those who were in the prime of manhood and womanhood, and to many, young and old, they have brought the common lot of death.

> "Leaves have their time to fall,
> And flowers to wither at the north wind's breath,
> And stars to set, but all—
> Thou hast all seasons for thine own, O Death!"

Twenty years may be—the last twenty years have been—filled with the rush of events, the advance of thought, and compress within their narrow limits the movements of centuries of olden time. "Better fifty years of Europe than a cycle of Cathay," says the poet; and better yet, with all their national affliction of civil war and its consequences, have been the last twenty years of our national life. The stormy discussion of slavery, its violent death, self-sacrifice on bloody battle-field and in bereaved homes, all wakened the higher life and aspiration not only of Unionist but of Rebel. We woke

> "To the higher aims
> Of a land that had lost for a little her lust of gold."

As a nation, we had the experience of an ordinary century between 1861 and 1866; as individuals, we seemed to have had the experience of half a lifetime in our growth in sentiment and in thought. I wish I could add that we had continued to grow, and that the nation's hour of the highest endeavor had not been desecrated, and the springs of its patriotism polluted, by the self-seeking of special privilege and the farther violation of the great common law of equal and exact justice!

In selecting a proper topic for this occasion, the centennial year of our nation's history inevitably suggests a historical examination of the progress of the art which this Society was organized to advance, and accordingly I shall ask you to listen to

A SKETCH OF OUR ILLINOIS HORTICULTURE.

Father Marquette, who, in 1673, descended the Wisconsin and Mississippi rivers, commends the horticultural pursuits even of our aboriginal population. "They also sow beans and melons, which are excellent, especially those with a red seed. Their squashes are not of the best. They dry them in the sun, to eat in winter and spring." Father Allonez, in 1676, affirms that "they eat fourteen kinds of roots which they find in the prairies. * * They gather on trees or plants fruits of forty-two different kinds, which are excellent;" but he does not tell us of any cultivation of these abundant products, and beyond these incidental notices we have no trace of what was done by the intelligent tribes that peopled our prairies.

FRENCH HORTICULTURE.

The French settlers, who are traditionally placed at Kaskaskia and Cahokia, about 1683 or 1685, like other pioneer populations, spent their time in hunting, fishing and other half savage pursuits, rather than in the culture of the earth. It is notable, however, that they appear in the early day to have given more attention to horticulture than the American settlers of a hundred years ago. Proofs of this are seen in the venerable pear trees of enormous size that still survive on the sites of the old French settlements. A writer, in a former volume of our Transactions, states that about the year 1700 the French about Cahokia commenced planting the seeds of apples and pears brought from France. He does not give his authority, but we may presume it was tradition. Another and earlier correspondent and member says that "Monsieur Girardin, a native of France, planted the first pear orchard, of very fine fruit, which he brought from his native country about the year 1780, at his farm near Prairie du Pont, one mile south of Cahokia; said trees, or some of them, are still healthy and bearing fine fruit every year. Some are as large as three to four feet in diameter." Besides these at this point, we find old pear trees, apparently seventy-five to one hundred years of age, at Cahokia, Kaskaskia, and near Nameoki station in Madison county. I think it is not improbable that trees were planted much earlier, but did not endure to a very advanced age, as compared with trees of the same sort in the milder climates of the sea coast.

The original settlers, with reminiscences of the cider orchards of Normandy, were doubtless more energetic in keeping up the supply of horticultural products than were their American-born descendants. Pittman, in 1770, says that the inhabitants made wine of the wild grapes "very inebriating," and "in color and taste very like the red wine of Provence;" but Reynolds adds that "this wine was made by the first settlers, but disappeared with the Europeans. The Creoles made little or none."

In some historical sketches of Randolph county, published in 1859, in a notice of Mrs. Maxwell, daughter of Pierre Menard, our former Lieutenant-Governor, I find mention of an ancient and honorable rose tree, the only trace of ornamental horticulture that I find in the early day. "She has in her possession," says the writer, "a damask rosebush which was brought from New Orleans more than a century ago. It is the first rosebush that ever bloomed in Illinois, and though it has been swept over by the floods of the last hundred years, it still retains its vigor and bloom, putting forth its sprouts at the annual recurrence of spring time."

"In horticulture," says Reynolds of the French, "they excelled the Americans. The lettuce, peas, beans, carrots, and similar vegetables, were cultivated considerably in the French gardens." "Their houses," says Ford, "were generally placed in gardens, surrounded by fruit trees of apples, pears, cherries and peaches." This was better than the average American even of to-day.

EARLIEST ORCHARDS.

As early as 1800, when a few American settlers had been established in the country about twenty years, Governor Reynolds states that "both the French and Americans possessed large apple orchards in proportion to the number of people in the country. The French," he adds, "also cultivated considerable orchards of pears, but the peach tree was almost entirely neglected." So far as I can learn, none of these orchards were planted of grafted or budded trees. Even that of M. Girardin, which I have mentioned, does not seem to have perpetuated anything more valuable than the Prairie du Pont pear, which Downing (under the name of Prairie du *Pond*) classes as "poor." Samuel Seybold, whose mother planted an orchard of 120 trees within the present limits of Madison county, in 1803, gives the same statement, that apples, pears and peaches were propagated from the seed. Some trees of this orchard were in bearing as late as 1874. Major Solomon Prewitt, who came to the State in 1806, told me that he did not know of any grafted fruit at that time. The French were in the habit of bringing up loads of apples from St. Clair into Madison county in the autumn and trading with the settlers. Some of the varieties were very good, from one of which Major Prewitt raised and set out in 1820 some forty seedling trees, some of which also proved very good. The Whitesides, of Whiteside station, in what is now Monroe county, and in Madison county, were noted as having orchards as early as 1806. In corroboration and addition to this, a writer in the *Gardener's Monthly* states that the Whiteside settlement of Monroe was made as early as 1790, and assumes the orchards to be planted

soon after. He adds that "most of the orchards planted at that time were seedlings; but one gentleman—a General Whiteside, I think—grafted a number of seedling apple trees with the best varieties he could obtain, and from these trees some very good apples have been somewhat disseminated through the West." This account, which I am unable to verify, is the first suggestion of grafting in Illinois. The Whitesides, according to Peck, came, however, in 1793, instead of 1790, as here stated. In 1810 there were grafted trees planted in Union county by a Mr. Wolfe.

From the year 1800 until the time of the admission of Illinois as a State, we find little evidence of horticultural progress. An orchard planted in Johnson county in 1814, by a Mr. Grogan, is said to have been partly of suckers from old trees. This is the first mention that I find of a method of propagation much used by our Southern and Western emigrants to secure their favorite varieties. It was considerably practiced during the next fifteen or twenty years.

THREE EARLY NURSERYMEN.

About the year 1818 three nurseries, at least, were established in the incipient State by Joseph Curtis, John Smith and Wm. B. Archer. Of these, Joseph Curtis, of Edgar county, an account of whose life and labors may be found in vols. 3 and 9 of our Transactions, is one of the most remarkable. A native of New Jersey, he came from Ohio up the Wabash in 1817, and heeled in some of the trees of his future nursery, in the soil they were to occupy, the same year. He continued in the business until 1845. He was an early and *honest tree peddler*, and his wagons, penetrating far into the center and north of the State, disseminated his varieties far and wide. He invented root-grafting in his early youth, and practiced it from the first in this State. He propagated pears and apples from root-cuttings, and thus made an advance on propagation by suckers. In 1845, his collection numbered 300 varieties of apples, 90 of pears, 28 of cherries, 25 of peaches, 30 of plums, 12 of grapes, besides other collections. It was a remarkable collection to have been made one-third of a century ago on the banks of the Wabash.

Another wide dissemination of good fruits was John Smith's, of Bond county, who planted apple seeds for a nursery near Greenville, in the autumn of 1818. His stock of varieties came from George Heikes, an emigrant from Pennsylvania to Kentucky. The result, though not so widely spread, was the same. He disseminated a large number of trees of what were and are standard sorts. Both Mr. Curtis and Mr. Smith received and disseminated the Rawles' Janet, Gilpin, Pennock, Milam, Newtown Pippin and Rambo. Mr. Curtis had the Early Pennock, Early Harvest and Smith's Cider, which Mr. Smith did not; and the latter disseminated the Pryor's Red, Limber Twig, and Pennsylvania Red Streak or Wine.

Col. Wm. B. Archer, the third upon this list, then a resident of Clark county, obtained apple seed from Warren county, Ohio, in 1818. "He drilled one bushel on the 25th of December that year, and advertised in a Vincennes paper 100,000 seedling trees for sale, it being the

only nursery then known by the settlers, except one on Shaker Prairie. The country far and near purchased with old rifles, shot-guns, work, and produce of any kind."

OTHER NURSERIES AND ORCHARDS.

Before 1830, nurseries of more or less importance had been begun in Adams county by John Wood (1820); in Edwards, by Sidney Spring (1825); in Jersey, by Robert Avery (1825); in Madison, by —— Masson (1820?); in Perry, by Joseph Bradshaw (1825?); in St. Clair, by —— Wood (1820?); and in Vermillion, by John Canady (1826). This list is no doubt quite incomplete.

Meanwhile, a great many orchards were planted out; and, at the risk of making many mistakes and omissions, I would state that the information returned to our Society furnishes the following partial list of pioneer orchardists, prior to 1830:

NAME OF COUNTY.	FIRST ORCHARD PLANTER.	DATE.	KIND.
Adams	Jno. Wood (since Governor)	1824	Seedlings.
Bond	John Smith	1820	Grafts.
Calhoun		1820–5	Suckers.
Clark		1820–5	Seedlings.
Clinton	{ N. McCracken, } { Daniel Simons, }	1817	Seedlings.
Edgar	Daniel Lane	1817	Seedlings.
Edwards	Anderson	1819	Seedlings.
Hamilton		1818–20	Seeds & Grafts.
Jefferson	F. R. Satterfield	1820	Seedlings.
Jersey	Philip Grimes	1820	Seedlings.
Johnson	Grogan	1814	Seed & Suckers.
Logan	{ John Downing, } { Jeremiah Berks, }	1826–7	Seedlings.
Madison	French and { S. Judy, } { Seybold, }	1802–3	Seedlings.
Marion	C. W. Jennings	1825	Grafted.
Mason	Garrett	1824	
Monroe	French and Wm. Whiteside	1791–2	Seedlings.
Morgan	John Wilson	1821	
Peoria	French		
Perry		1808–15	
Piatt		1825	Seedlings.
Rondolph	French		
Richland	James Parker	1822	Grafts.
Sangamon	Kelly	1824	
St. Clair	French		
Schuyler	J. D. Manlove	1826	Seedlings.
Vermillion		1825	
Wabash		1826	Seedlings.
Warren	W. R. Jamieson	1829	
Washington	Livesay Carter	1824	
Woodford	Austin Crocker	1824	

This list comprises, it will be noticed, the southern and mainly the river counties. During the next decade—from 1830 to 1840—orchards

were probably planted, and nurseries of more or less importance established in nearly all the northern and newer counties. In Bureau county, a nursery was established by John Hull, about 1830 or 1831, and orchards planted a few years later. Sample M. Journey is said to have planted an orchard in Carroll county, in 1837, and Wm. Sadorus one of the Milam sprouts in Champaign county, in 1838. Joseph Vial and Samuel Elston are said to have planted the first orchard of seedlings in Cook county, about 1831-2. James Gardiner is named as the first orchard planter, also of seedlings, in Fulton county, in 1831. William Hoge planted an orchard of grafts, in Grundy, in 1832. Hancock is said to have had its first orchard planted of grafted fruit from Kentucky by a man named Castro, in 1831. The first orchard of Iroquois is placed at 1837, and the first of Kendall in 1836, planted with seedling trees by George Hollenback. In LaSalle county, orchards are said to have been planted by a number of persons in 1833-4; in Lee county, not before 1840, and then of seedlings. In Livingston county, U. and G. Blue are credited with the first orchards, in 1832. In Macon county, the earliest orchards of grafts were planted about 1828-9; but seedling trees, somewhat older, probably, were bearing on what are now Dr. John's premises, about an Indian station, in 1834. In Macoupin, James Breden planted a seedling orchard in 1830. In Marshall, J. Straum and J. Mier planted orchards in 1831; in Mason county, a man named —— Garrett, in 1824. The first orchard credited to McLean is of the date of 1836, and the first in Ogle, of grafts, to a man named Wamsley, in 1838. Rock Island had an orchard of seedling trees planted no earlier, it is said, than 1842, which is hardly possible. In Will county, Joseph Shoemaker is said to have planted the first orchard of grafted fruit, in 1835. Dr. Geo. Haskell planted the first in Winnebago, of improved fruit, in 1839. This attempt at a list of early orchards I believe to be equally liable to correction with the earlier list; but it may answer as a basis. From forty-eight counties there is no information given in our Transactions. I hope the horticultural historians of these counties will bestir themselves, and furnish our Secretary with the needed information. These counties, I believe, are Alexander, Boone, Brown, Cass, Coles, Crawford, Cumberland, DeKalb, DeWitt, DuPage, Fayette, Ford, Franklin, Gallatin, Greene, Hardin, Henderson, Henry, Jackson, Jasper, Jo Daviess, Kane, Kankakee, Knox, Lake, Lawrence, Massac, McDonough, McHenry, Menard, Mercer, Montgomery, Moultrie, Pike, Pope, Pulaski, Putnam, Saline, Scott, Shelbey, Stark, Stephenson, Union, Wayne, White, Whiteside and Williamson.

Up to the period we have now reached, about 1840, it will be noticed that while many and valuable orchards have already been planted, very little has been done in the establishment of permanent nurseries, or the cultivation of ornamental trees, shrubs, etc., for sale. Up to this time I know of but one published Illinois nurseryman's catalogue of plants for sale. That was published in *The Western Ploughboy*, of Edwardsville, November 24, 1831—forty-five years ago—by Collet & Mason. If there be any other prior to 1840 I should be glad to see it. The ornamental

part of this nursery consisted of "Black Locust, Locust Vine, Honeysuckle, Althea, Lilac, Roses, a great variety, and Evergreen Myrtle." Think of that, you publishers of three or four special catalogues!

THE NEW ERA.

But in the region of 1840 we begin a new era. The Bryants and Samuel Edwards established themselves in Bureau county; John A. Kennicott and M. L. Dunlap settled in Cook, and Louis Ellsworth in DuPage. The Overmans came to Fulton; O. B. Galusha and S. G. Minkler came to Kendall; Robert Douglas to Lake; Jabez Capps to Logan; the Whitneys to Lee; Jonathan Huggins, A. A. Hillard and J. A. Pettingill to Macoupin; Dr. B. F. Long, the Starrs and Dr. E. S. Hull to Madison; Tyler McWhorter to Mercer; Prof. J. B. Turner to Morgan; Edson Harkness to Peoria; Smiley Shepherd to Putnam; Dr. L. S. Pennington to Whiteside, and Dr. Geo. Haskell to Winnebago. Here again is an imperfect list, which should, I suspect, be a good deal increased by the names of some whose date of settlement I do not know.

At this time there was a quickening of agricultural life all along the line. Immigration came in rapidly. The Union Agricultural Society and other organizations of a kindred character were formed. *The Union Agriculturist*, later *The Prairie Farmer*, began to be published, and elicited the experience, the hopes and the aspirations of the more cultivated part of our new settlers. It was the morning time of agricultural life in our then new and beautiful Prairie State; and these young fellows I have been naming, as they gazed over the broad and balmy wastes of flowers, were doubtless as enthusiastic, as positive and as hopeful as it is the prerogative and happiness of youth to be. "The world seemed all before them where to choose." "Fair as the garden of the Lord," the beautiful valleys and oak-crowned eminences of the Rock and Fox rivers were spread out towards the sunset. Along the picturesque bluffs of the Illinois, and on the broad bosom of the Mississippi, brooded the spirit of romance and adventure, of high hope and undefined purpose, wherewith youth invests even the commonplaces of life. "The unshorn fields, boundless and beautiful," were doubtless peopled by these young enthusiasts, in their fancy, with a new population. Like Cobbler Keezar, they had their vision. The lines of the landscape, in their imagination,

——"Were broken
By many a steepled town,
By many a white-walled farm-house,
And many a garner brown.

* * * *

"Yellow and red were the apples,
And the ripe pears russet brown,
And the peaches had stolen blushes
From the girls who shook them down.

"And with blooms of hill and wildwood,
That shame the toil of art,
Mingled the gorgeous blossoms
Of the garden's tropic heart."

So, perhaps, they dreamed, before the arctic cold and tropic heat and desert drouth of an uncertain climate made them sadder and wiser men. If it turned out a paradise in which the borer thrived and the curculio increased as time advanced, it was not the first time that the dreams of youth have been rudely broken by experience.

EDSON HARKNESS.

Among these ardent horticulturists of a third of a century ago, one of the most conspicuous, by his zeal in horticulture, and especially in promoting horticultural associations, was Edson Harkness. I know little of his history and never saw him; and therefore speak of him under disadvantages. He came to the State about 1835, from Maryland. About 1840 he established a nursery at Trivoli, in the western part of Peoria county, where he remained until as late as 1855, about which time he removed to California, where he died about the year 1865. Our brother Bourland, writing of him about 1865, said he "did much to disseminate good fruits and correct ideas," until he went to California, "where upon a rocky hill-side, sloping toward the Pacific, our good old friend now works and prays, and is doing for California what he did in days gone by for Peoria county. He is always successful, but never makes money." In looking through his correspondence in the early volumes of *The Prairie Farmer*, I find he was an early experimenter with and propagator of the Osage Orange as a hedge plant, and an enthusiastic supporter of Industrial Education. But his special merit, as I consider him now, was his early and successful effort to gather the nurserymen and fruit-growers of the State into a convention. He broached the subject in 1845, but without success. He tried again in 1846, and receiving a favorable response from C. R. Overman and Samuel Edwards, he called a convention at Peoria, October 15th.

THE FIRST STATE HORTICULTURAL MEETING.

This meeting, held thirty years ago, is, so far as I know, the first meeting of horticulturists held in our State, and among the first, if not the first, in the Western States. It would be almost proper to claim it as the birth-place of this organization. Edson Harkness was its leading spirit, Samuel H. Davis was its Chairman, and John A. McCoy, of Peoria, its Secretary. The other persons named as present were Smith Frye, of Peoria, of the State Agricultural Society; Stephen Dewey, of Lewiston, Fulton county; A. P. Bartlett, of Peoria, merchant; Charles Ballance, of Peoria, lawyer; Isaac Overman, C. R. Overman and N. Overman, of Canton, Fulton county; Dr. R. Rouse, of Peoria, physician; David Bohen, W. H. Ellis, L. Holland, John Porter. Of these fifteen persons perhaps half were professional, several being citizens of Peoria who desired to testify to their interest in the undertaking in this way. Mr. Harkness exhibited forty varieties of apples, besides quinces, grapes and pears. The Overmans, Mr. Dewey, and Elijah Capps, all of Fulton, and Mr. Lineback, of Peoria, also made exhibitions. A committee of five was appointed to report a constitution and by-laws to the next annual

meeting, and Edson Harkness was elected temporary President, Stephen Dewey Corresponding Secretary, and A. P. Bartlett Recording Secretary. Mr. Harkness delivered an address, which, together with the proceedings, may be found in *The Prairie Farmer* for December, 1846. He concludes the address, in which among other things he predicts the great future importance of hedging and grape pruning, by saying: "I have sometimes permitted myself to dream how the undulating surface of our rich and beautiful country will look when fully redeemed from its wilderness and subjected to the changes which industry combined with intelligence and taste must produce. In these day-dreams I have seen wide, clean avenues stretching away in the distance for miles, inclosed on either side with a banner of living green. Along the borders of these avenues neat farm houses and cottages, the abodes of an industrious, intelligent and happy people—every dwelling surrounded with beautiful trees, shrubs and vines. In the back-grouud, stately orchards, all gleaming with delicious fruit, well cultivated fields, rich meadows, and pastures are dotted over with fat, contented herds and flocks." Such was the aspiration of the man who may be called the founder of our Society.

CYRUS R. OVERMAN.

At this meeting appeared another face which many learned to love—of the genial and enthusiastic Cyrus R. Overman. He came to this State from Indiana as early as 1844, and resided at the "Mound Nursery," near Canton, until 1855 or 1856, when he removed to Normal, McLean county, where he died in 1865. An enthusiast, like so many of his brethren, his favorite object was to secure a live fence for our great prairies. He experimented extensively with the Washington thorne; but his final favorite was the Osage Orange, which he and his associate, W. H. Mann, grew in immense quantities. He was present at the organization of this Society in 1856, was elected its President in 1861, and was a zealous and active member till his death.

JOHN A. KENNICOTT.

Within a few months from the date of the Peoria meeting, the Chicago Horticultural Society was organized, with J. H. Kenzie as its President. It held at least five successful exhibitions. Among its prominent exhibitors appears the name of Dr. John A. Kennicott, also well known to a former generation of Illinois fruit-growers. He came to Cook county in 1836, and immediately began to grow fruits and flowers and trees. A ready and readable writer, a good talker, and an enthusiastic devotee of the art that does mend nature, he did much during his quarter of a century's sojourn among us to waken and inform the mind of farmer and fruit grower. He was elected President of the Northwestern Fruit Growers' Association in 1851 and 1852, and of this Society in 1860. He died June 4th, 1863, and was buried among the flowers he loved at Northfield.

The Prairie Farmer for November, 1847, contains an account of what it calls "The Annual Meeting of the Illinois Horticultural Society, convened at Farmington, Fulton county, according to adjournment, on

Wednesday, October 13, 1847." The meeting of 1846, and its temporary organization and committees, seemed to have been ignored. Dr. Hannaford was appointed Chairman, and C. R. Overman, Secretary. Other persons present appear to have been Edson Harkness and Wm. J. Phelps, of Peoria county; Elijah Capps and H. S. Hiatt, of Fulton county; Samuel Edwards, of Bureau county; Isaac Merriman and John Hancock, of Tazewell county; Bartlett Walker, of Knox county; and James Bull. Fruits were sent by Arthur Bryant, of Bureau, Godfry, of Knox, and Watson, of Henderson, but these gentlemen do not appear to have been present. A few varieties of dahlias were exhibited. The Bois d'Arc was favorably spoken of as a hedge plant by Mr. Hancock, and the ravages of insects and remedies discussed. The report of the committee on fruits describes the Fulton Pippin, which seems to have been the Fulton. Another committee on constitution was appointed, and the meeting adjourned to meet in Peoria, in September, 1848, but I cannot learn that it ever did so. Whether for want of a constitution, or some other cause, this early attempt at organization seems to have failed, but was renewed by a meeting held December 18th and 19th, 1850, at Princeton, Bureau county, from which originated the Northwestern Fruit Growers' Association. Edson Harkness was President, and F. K. Phœnix, of Wisconsin, Secretary. Other persons present were: C. R. Overman, Arthur Bryant, Lloyd Shaw, A. R. Whitney, Samuel Edwards, John H. Bryant.

On the 1st and 2d of October, 1851, this convention met again at Princeton and organized the Northwestern Fruit Growers' Association, which continued in existence until 1857, when it became merged into the Illinois State Horticultural Society. It held meetings at Dixon in 1852, at Chicago in 1853, at Burlington, Iowa, in 1855, and at Alton in 1857.

Among those in attendance on these meetings we find the names of Dr. John A. Kennicott, Dr. L. S. Pennington, S. M. Coe, A. R. Whitney, Smiley Shepherd, Williamson Durley, Tyler McWhorter, Henry Shaw, J. T. Little and H. N. Bliss, in 1851; F. R. Elliott, D. F. Kinney, W. H. Mann, Dr. George Haskell, Charles Kennicott, S. G. Minkler, O. B. Galusha, A. S. Coe and Daniel Long, in 1852; Charles Downing, A. H. Ernst, Dr. John A. Warder, B. Hatheway, James Smith, William Stewart, Sr., Isaac B. Essex, H. P. Kimball, M. L. Dunlap, Robert Douglas, E. G. Mygatt, Lewis Ellsworth and J. G. Bubach, in 1853; and P. Barry, G. B. Brackett, Dr. E. S. Hull and Wm. R. Price, in 1855; Floyd Shaw, James E. Starr, N. J. Colman, Dr. B. F. Long, Frank Starr and others, in 1857.

M. L. DUNLAP AND E. S. HULL.

In this list we recognize two names that should not be passed without a tribute to their memory—Mathias L. Dunlap and Edwin S. Hull. Both officers of this and other organizations of a kindred character, each in his sphere did a great work for his adopted State. Mr. Dunlap came to Illinois in 1836, in 1838 became a farmer at Leyden, Cook county, where he planted an orchard, and in 1846 established a nursery. In 1857 he removed to Champaign, where he resided until his death in 1875. He

held numerous positions of public trust, but it is as a worker in the cause of agriculture and horticulture that he will be remembered. An early writer in the then solitary agricultural paper of the State; six years editor of the Illinois *Farmer*, long a widely read correspondent of the Chicago *Tribune*, it is safe to say that no man in the State exercised so wide an influence in his calling. Dr. Hull came to the State in 1847 and purchased a farm near Alton, which he planted with the latest and most approved varieties of nearly all fruits. In 1863 he removed to his Alton Bluff farm, where he remained until his sudden death in 1875. His peculiar fame was founded on his magnificent fruits. "By their fruits ye shall know them." His peculiar theories and practices of fruit culture commanded attention and secured respect when they did not enforce conviction. He aided in organizing the first attempt at a horticultural society at Alton in 1851, and again in 1853. In 1856 he assembled with others at Decatur, December 17, and organized the Illinois State Horticultural Society. As its President then, and in 1875 as State Horticultural editor of *The Prairie Farmer*, he exercised a marked influence on fruit culture in the West, and secured a national reputation. Within his own range of topics he was a more influential authority than any in the State, for a period of nearly thirty years.

BIRTH OF THE ILLINOIS STATE HORTICULTURAL SOCIETY.

December 17, 1856, as I have said, was the date of the meeting at Decatur when this Society was organized. The names of thirty-one persons are recorded on its list of members, ten of whom were from Madison county, three each from Cook and Union counties, two each from McLean, DuPage, Macon and Marion, and one each from Tazewell, Kendall, Adams, Fulton, Rock Island, Edgar and Sangamon. Eight of the thirty-one I know to be dead, and probably the list of the deceased is greater.

The list of members was: D. S. Allen, Decatur, Macon; John Atwood, Alton, Madison; Allen Bainbridge, Jonesboro, Union; D. J. Baker, Alton, Madison; A. S. Barry, Alton, Madison; George Barry, Alton, Madison; J. E. Crandall, Chicago, Cook; M. L. Dunlap, Leyden, Cook; Lewis Ellsworth, Naperville, DuPage; S. Francis, Springfield, Sangamon; Elijah Frost, Godfrey, Madison; O. B. Galusha, Lisbon, Kendall; E. S. Hull, Alton, Madison; R. W. Hunt, Naperville, Du Page; H. C. Johns, Decatur, Macon; Chas. Kennicott, West Northfield, Cook; Wm. Kile, Paris, Edgar; B. F. Long, Alton, Madison; W. H. Mann, Bloomington, McLean; Joseph Miller, Alton, Madison; H. E. Newton, Moline, Rock Island; Henry Oswald, Jonesboro, Union; C. R. Overman, Bloomington, McLean; N. Overman, Canton, Fulton; Chas. B. Pelton, Jonesboro, Union; John P. Reynolds, Salem, Marion; L. Shaw, Fremont, Tazewell; F. Starr, Alton, Madison; Jas. E. Starr, Alton, Madison; Wm. Stewart, Payson, Adams; and Cyrus Webster, Salem, Marion.

From that period until the present, our Society has not failed to hold an annual meeting of from two to four days' duration. Commencing

with 1860, it has published an annual report (except that of 1861 and 1862, which were embraced in one volume). The total number of its published pages is nearly 4,000, and embraces papers and discussions upon all branches of horticulture, and upon the related sciences of botany, entomology, as well as the proceedings of kindred and subordinate societies. In 1867, it received a new impulse, and its efficiency was greatly promoted by a State appropriation of $2,000 per annum, which has been continued since that time.

Its numbers have never been large, but the influence it has exerted, directly and indirectly, has been great. It has not only corrected nomenclature, and disseminated information as to the best varieties and the best modes of cultivation in fruits, but it has done much to call attention to the great need and possibility of line fences in our great prairies, and to the related and equally important topic of tree-culture. It has done more to call attention to the study of botany and economical entomology, and to the cause of agricultural education, than any similar body in the country. Its views and policies have usually been broad and catholic, and it has always been freer from what, for want of a better name, I will call old-fogyism, than most bodies of men. Upward and onward has ever been its motto.

HORTICULTURAL PROGRESS.

Meanwhile, horticultural production has wonderfully increased. In 1840, the orchard products of this State were valued at $126,756; in 1850—about the time of the first horticultural organization, and before the railroad era was fairly entered upon—they amounted to $446,049; in 1860, to $1,122,123, and in 1870, to $3,571,789, being an increase of 800 per cent. in twenty years. According to the returns of our assessors, about one acre in every hundred of our State is planted in orchards at this time. The increase in other branches of horticulture, in the growing of grapes and of small fruits, has been even more marked; and whatever be the discouragements—and they have been many—of the horticulturists, the love of the "beautiful and the good" overcame them sooner or later.

PROFIT AND LOSS.

These discouragements are the meteorological changes which apparently make our climate extremes of heat, cold, drouth and wet greater and more destructive to vegetable life than formerly; the increase of diseases, which accumulate, as it were, in districts long planted; the increase of insects by the same cumulative process, and the deterioration and decay that come of weakened vitality, and the neglect that comes from unfruitfulness in decrepit trees, and loss of hope on the part of the planter.

On the other hand, there is a better understanding of natural sciences in their application to practical horticulture. Both botany and vegetable physiology, even a little understood, enable nurserymen and fruit-growers to cast aside a great many suspicions of the craft, and to guard the weak points of their wards. It is to be noticed in this connection, also, as a

significant fact, that the nurseryman, and even the market-gardener and fruit-grower, tend more and more to get rid of the uncertainties of their occupation by taking shelter under glass. They thus can absolutely control the conditions, at more expense, it may be, but with certainty. In the case of the coarser and cheaper orchard fruits, we learn to control conditions partially—by selection of hardy varieties, by shelter, by cultivation that insures vigor of growth and early ripening of wood and bud, and the like.

But my talk is longer than I fear your patience may be, and I must conclude. I count ourselves fortunate in having taken part in the material, intellectual and moral development that has attended the progress of this Society during the twenty years just closed. I do not believe that our labors and influence have made many millionaires; but I do believe that they have made thousands of rural homes more pleasant places of abode, and stirred the diviner love of nature—of fruits and flowers and trees—in many a heart. This Society has at least helped to make our men and women and children more intelligent and refined, happier and better, and so has done something towards attaining the great end of human existence.

I look about me upon faces that have grown care-worn and heads that have grown gray in this their chosen life-work. I count them ministers of a gospel as universal as the race, and which has its apostles in every land, from farthest Cathay to California—a gospel of good works, whose temple is arched by the broad dome of heaven and floored by the fertile fields of earth—a gospel written in the perfumed violet beneath our feet, and pointing heavenward in the forest towers of the Mariposa.

"Each floral bell that swingeth
And tolls its perfume on the passing air,"

calls worshipers to its shrine. From Greenland's icy mountains, where the lettuce and radish tax the gardener's skill, to India's coral strand, exuberant with the prodigal vegetable life of the tropics, our art has its votaries. And if, as the Zendavesta says, "to be a saint a man must be the father of orderly children, must plant useful trees, must destroy noxious animals, must convey water to the dry lands * * and work out his salvation by pursuing all the labors of agriculture," then *we are the saints.*

APPENDIX TO ABOVE REPORT.

FIRST ORCHARD IN SCHUYLER.

I see, in a horticultural meeting of your State, Mr. Flagg gives statistics of the first orchards made in certain counties, a large number of the counties not being reported. Having become a resident of the State in 1824, and of Schuyler county in February, 1825, I can say I planted the first orchard in Schuyler, spring of 1826, and B. Chadsey the next—both seedlings. I paid twenty-five cents per tree. Cornelius Vandeventer planted the first in Brown county. Archibald Job planted the first in Cass county, and I think Steven Osborn the first in McDonough county. These three have gone to their final rest.

We are having the longest spell of cold weather I have seen during a ten years' residence here. The ground is and has been covered with enough snow for sleighing for three weeks. All kinds of produce to feed stock is plenty, and stock is doing fine. Corn, twenty-five cents a bushel; hay, three to four dollars per ton; potatoes, seventy-five cents a bushel; apples, one dollar per barrel, and coal $1.80 per ton. Hog cholera prevailing to some extent.

Emigration has been large to Kansas last season, and prospects ahead are good, provided the 'hoppers don't levy on assets in the spring. Various opinions prevail here in regard to that danger. Our show of cereals and fruit at the Centennial speaks for us in unmistakable language.

Success to the farmer. I am too old to farm, but not too old to write about it. J. D. MANLOVE.

FORT SCOTT, Kansas.

NOTES OF THE PLANT-LICE FOUND IN THE UNITED STATES.

BY CYRUS THOMAS PH. D., STATE ENTOMOLOGIST.

CARBONDALE, ILL.

PROF. O. L. BARLER.

Dear Sir: I herewith submit a paper on the Plant-lice (*Aphidæ*) for the Transactions of the Illinois State Horticultural Society. It has been gotten up somewhat hastily and does not purport to be a record of personal observations, but simply a statement of the present status of our knowledge regarding the species found in this country. My object in submitting it now, is to call attention to these insects, with the hope that our horticulturists, farmers and others interested may be induced to pay more than ordinary attention to them, and furnish me during the coming summer with such new facts as they may come in possession of, as I desire to devote a large portion of my next report to these insects and the Bark-lice. I am satisfied that the injury caused by these diminutive pests is really greater than is generally supposed, yet Dr. Fitch appears to be the only American entomologist who has paid any special attention to them. As will be seen, I have drawn very largely from the reports of this able entomologist; so largely, in fact, that I have not attempted to mark as quotations the numerous descriptions copied therefrom. One reason for this is, that in many cases I have slightly changed his language, in order that it may be more easily understood by the ordinary reader, or to correspond with some fact in my own knowledge or ascertained elsewhere. I therefore take this method of making a full and general acknowledgment of the aid I have received from this author's works. As a general rule, where he is the author of the species, and no comments are added, after or prefixed to the description, the latter is in great part taken from his works.

I also take pleasure in acknowledging my indebtedness to the writings of Mr. Walsh, Dr. LeBaron, Prof. Riley, Dr. Shimer, Dr. Packard, and others.

Permit me to add further, that I am endeavoring to seize upon all such opportunities as the present to place in reach of our farmers, horticulturists, teachers and entomological students the description of insects found, or likely to be found, in Illinois, which are injurious to vegetation. These descriptions, as a general rule, are scattered through numerous works inaccessible to most readers, and usually in language with which unscientific readers are not familiar.

The very common method of giving the descriptions and history of a few species of a group, as illustrations of the group, and leaving the reader entirely ignorant as to the rest, is exceedingly tantalizing to those in search of practical information.

Trusting that this may be of some benefit to the horticulturists of Illinois, I remain,

Yours very respectfully, CYRUS THOMAS,
State Entomologist.

PLANT-LICE.

There is scarcely an individual, old or young, who has paid any attention to plants during the summer, that has not observed upon the leaves or stems, twigs or bark, minute, soft-bodied insects busily engaged in sucking the sap, usually without wings and generally huddled together in little groups. These insects, on account of their resemblance to certain other insects, and their parasitic habits, have, by common consent, received the very appropriate name of *Plant-Lice*. Scarcely a plant in the vegetable or flower garden, a bush or tree in the yard, orchard, nursery, vineyard, grove or forest, but what at some time appears to be infested by them in greater or less number. And not only is this true in the temperate climate of our own latitude, but if we move south to the tropics, or pass to the cold regions of the north, we find the same thing true there.

On account of their general similarity in appearance and habits, ordinary observers have been content with simply designating them by their common name. That they somewhat closely resemble each other in general appearance, as well as in the habit of subsisting upon the juices of the plants on which they reside, is true; but when we come to examine them closely and compare them carefully one with another, we find there are marked differences in the details of their external anatomy as well as their habits, showing not only that there is a vast number of different species, but also that the species readily admit of being aggregated or arranged into groups by common characters; or, in other words, that there are generic and family differences, as well as specific differences, among them.

For example: A number of species possess the power of leaping, all of which have the antennæ terminated by two minute bristles, in both of which respects they differ from all the other species; some are always

found more or less covered with a whitish cottony or downy substance, while others are always naked; some possess little horn-like appendages, called "honey tubes," arising from the upper part of the abdomen near the tip, while others are entirely without these; some have the very singular habit of bringing forth their young alive, while others are always oviparous; some confine their operations exclusively to the leaves, others to the twigs and bark, and others to the roots, while others operate both on the stem and root or leaves and roots; some reside exposed on the surface of the leaves or bark, while others, by some peculiar power, not yet well understood, form galls in which they carry on their operations and pass the greater portion of their existence; in most cases the pupæ are active as the perfect insects, yet there are some species in which these are stationary, and resemble the apparently lifeless scale of the Bark-lice.

Most of the species, at some period of the year, present winged individuals of one or both sexes, yet their habits in this respect are widely different, and the differences between the wings of the different species afford some of the best characters yet observed for separating them into generic or larger groups. For example: In a very large portion, in fact in most of our American species, the wings are very thin and membraneous and almost perfectly transparent, while in one very singular group they are opaque and more or less covered with a fine powder, giving them the appearance of minute moths. Very marked differences are found in the veining of the transparent wings of the former; in some the rib-vein or chief vein of the forewings is central, and as it proceeds toward the apex divides into branches, each of which is again divided; while in another very large group the rib-vein coasts along near the front margin, giving off on the posterior or inner side three branches which run obliquely outward and backward to the hind margin; some have the third or outer branch twice forked, others once, while in others it is simple or unbranched. Some species place their wings, when in repose, against each other, above the back, in the form of a very steep roof, while others rest them horizontally on the abdomen. Some have the antennæ as long or even longer than the body, while in others these organs do not reach the middle of the thorax; these organs, when tipped with two bristles, are usually stem or nine-jointed, while in all other cases they are but seven or less than seven-jointed.

Some of these differences will doubtless be considered unworthy of notice by those who have never devoted any time to the study of insects and their characters; but when it is found by close and persistent study of the habits of these insects that the difference in the number of forks in one of the branch or discoidal veins is always accompanied by a marked difference in habits, this character, although apparently insignificant, is really important. A knowledge of these facts enables the entomologist, if he can see but a single tiny forewing, to tell at once to what group the species belongs and what are its habits.

Notwithstanding these differences between the groups and species, there are certain characters in which all agree, the more important of which are as follows:

1st. In having the mouth formed for sucking, by being prolonged into a slender, horny, jointed tube, which arises far back under the breast, apparently between the front and middle legs.

2d. In not undergoing a complete transformation, as do the beetles, butterflies, etc.; the larvæ and pupæ being similar in form to the perfect insect.

3d. In having but two joints in the tarsi or feet.

4th. In having the antennæ longer than the head, and composed of file-form joints.

5th. In the fact that the winged individuals always have four wings.

6th. In the fact that all live upon the juices of plants.

7th. In their small size, no species of our country exceeding one-fourth of an inch in length of body, while many fall considerably short of one-tenth of an inch.

The character of the mouth and of the wings, and the fact that they do not undergo a complete transformation, place them in the order HOMOPTERA, which also includes the Seventeen-year Locusts and other Cicadas or Harvest-flies, Tree-hoppers, Leaf-hoppers, etc.

The Plant and Bark-lice are usually placed by entomologists in one distinct section of this order, these two groups constituting the second section of the order, while all the rest are contained in the first section. These two divisions are distinguished from each other chiefly by the position of the beak or mouth.

This section has been variously divided and arranged by different authors, according to the characters which they conceived to be of most importance. For present purposes the arrangement indicated in the following brief synoptical table will suffice, although not the latest.

SEC. II.—PLANT AND BARK LICE.

The beak arising apparently from the breast between the anterior and middle legs; tarsi, or feet, not more than two-jointed, sometimes with but one joint.

A. A beak present in both sexes; wings, when present, four; never changing, in the perfect state, into an apparently lifeless scale. (*Plant-lice.*)

B. The four wings transparent; the pupæ active and not scale-like.

C. Possessing the power of leaping; the antennæ thread-like, composed of nine or ten joints, and tipped at the end with two minute bristles. 1 Fam. PSYLLIDÆ.

CC. Not possessing the power of leaping; the antennæ usually six or seven-jointed, without the two bristles at the tip. 2 Fam. APHIDÆ.*

BB. The four wings opaque, farinose; the pupa inactive and scale-like. 3 Fam. ALEURODIDÆ.

AA. No beak in the perfect male; wings present in the male only, and but two; female changing in the perfect state into an apparently lifeless scale. (*Bark-lice.*) 4 Fam. COCCIDÆ.

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*NOTE.—I follow Westwood in the method of writing this name; perhaps it would be more correct if written *Aphididæ*, but the form I have adopted is that originally given by Leech, adopted by Westwood, Fitch, Packard and others, while *Aphididæ* is the form adopted in Curtis' Farm Insects, and by Harris.

It will be seen by reference to this table, that according to this arrangement the Plant-lice are divided into three families—*Psyllidæ*, *Aphidæ* and *Aleurodidæ*—but some authorities, especially those of recent date, are disposed to include the last in *Aphidæ*, thus dividing the group into but two families.

As this paper is only preliminary to a more extended article on these insects in my next report, I will not devote any further space at present to the discussion of the arrangement and classification. I will also, for the same reason, occasionally mention some species which I am at present unable to describe, and some which I have no positive evidence are found in this State. This is done for the purpose of calling attention to them, with the hope that those who read this paper may give a little more than usual attention to these insects during the coming summer, and send me such as they think are new, or not fully described herein. In other words, it is intended not only for the benefit of our horticulturists, but also as an aid to all those, who may desire to do so, in studying these singular and important insects ; and to call forth as many facts as possible in reference to them, for my next report.

In order to prevent repetition, I will defer the further account of their history, character and habits, giving those applicable to the different families in their proper connection.

Psyllidæ. (Jumping Plant-lice.)

As but few species of this family belonging to our American fauna have, as yet, been described, although doubtless many are to be found here, I will give the family and generic characters with a little more particularity than I should otherwise do.

They are similar in appearance to the ordinary plant-lice, but the head is broader and resembles, somewhat closely, the head of a little leaf-hopper; it is short and generally triangular in front, and usually deeply cleft in the middle of the front; the eyes are lateral and prominent; and, in addition to these true eyes, they are furnished with three ocelli, or little simple eyes, placed on the top of the head in a triangular form, one close to the inside of each eye and one on the middle of the front where the cleft or notch commences. The antennæ, which are rather long, slender and thread-like, present the most prominent characteristic for distinguishing the family, in the two little bristles with which each is always furnished at the tip; they are usually ten-jointed, though in some species there are but nine or even eight, and, if I am not mistaken, in one American species there are eleven; the basal joint is usually thick, and in one genus the second joint is greatly dilated. The beak is short and three-jointed, arising almost between the fore-legs. The hind margin of the sternum or breast usually terminates on each side with a little spine. The wings, which occur in both sexes, are four in number, and when at rest are placed over the abdomen in the form of a very steep roof; the front pair have a strong mid-rib or mid-vein running through the middle and dividing near the center into three principal branches, each of which is usually further divided into two branches; the veins of

the hind wings are quite slender. The abdomen of the females is terminated by a conical ovipositor, and in the males is usually furnished with several short erect appendages; but in neither do we find the corniculi or honey tubes, so common in the true Aphides. The tursi, as before stated, are two-jointed; and all the species possess the power of leaping, like the leaf-hoppers, hence the generic name *Psylla* (which formerly included all these species), which was the Greek name for a jumping insect, was given to them by Geoffroy. Their general habits are very similar to the leaf-hoppers, with which, in this respect, they appear to be closely allied.

They subsist, in all their stages, upon plants; and the species are doubtless very numerous, although but few, as before stated, have been described in this country. The larvæ have the body quite flat, the head broad, the abdomen rounded, and the antennæ, at first, apparently one-jointed; the pupæ show the rudimentary wings in the form of four comparatively large, broad scales, attached to the sides of the thorax. Many of the species are covered, during the larva state, with a delicate cottony substance, usually arranged in flakes; though some, as our most common species, are naked. A few species, as for example one which inhabits the hackberry, form galls, in which they reside.

The species, so far as I am aware, without any exceptions, deposit eggs, from which the young are hatched, and do not bring forth living young as do most of the true Aphides.

The characters, therefore, by which we may distinguish them from the Aphides, are as follows:

The two little bristles at the tips of the antennæ; their habit of leaping; the form of the head, and the veining of the wings.

The family has been divided into quite a number of genera, some of which depend on very slender characters, but at present we shall have occasion to refer only to two or three of these.

Genus Diraphia.

There are no common names by which to distinguish this or other generic groups from each other. I am unable to give, at present, the full characters of this genus, which, I believe, was established by Mr. Waga; but as it was originally included in *Livia*, with which it is closely allied, I may, from this fact and from the characters of some of the species, give sufficient for the reader to locate species with reasonable certainty.

In *Livia* the head is square, flat above, deeply cleft in front, extending anteriorly in two conical tubercles; no ocelli, or little eyes; antennæ not much longer than the head and thorax; ten-jointed, the first joint short and thick, the second joint much dilated or enlarged, and three or four times as long as the first; the seven following of equal size, small, tipped at the end with two minute bristles, usually of unequal length; wings as heretofore described, except that the front pair are sometimes slightly leathery and but semi-transparent.

Serville and Amyot say that *Diraphia* differs from this only in having the head much larger, and in the second joint of the antennæ not being comparatively as long as in that genus. They also appear to doubt the

propriety of the formation of the genus. In fact Dr. Fitch, when he first described the following species, placed them in *Livia*; therefore, for all practical purposes, the two may be considered as synomyms:

1. *Diraphia vernalis*, Fitch. The Vernal Diraphia or Jumping Plant-louse.

Found upon the leaves of the pine during the greater part of the year, puncturing them and sucking their juices. They are of an orange-yellow or bright rust-red color, about (.15) one-seventh of an inch in length, with a square flattened head, concave on its upper side, with a slight impressed line along the middle, and a small notch in the middle of the front. The antennæ short and thread-like, about as long as the head; their basal joint largest, and forming one-fourth of their entire length; their tips black, and ending in two short, fine bristles of unequal length; the fore-wings thick and leathery, feebly transparent, dull, pale, brownish yellow; the breast coal-black and legs pale.

2. *Diraphia femoralis*, Fitch. The Black-legged Diraphia.

This is probably only a variety of the preceding species, from which it differs only in having all of the thighs of the same deep black color as the breast. Found on pine leaves in July.

3. *Diraphia calamorum*, Fitch. The Calamus Diraphia.

Found on the sweet-flag (*Acorus calamus*). About one-tenth of an inch long to the tip of the abdomen, and one-seventh to the tips of the closed wings. It is paler than the preceding, being, according to Dr. Fitch, of a dull gray or clay color, with the anterior lobes of the head of a reddish tint, and has no impressed line along the middle of the head. It is black beneath, with the abdomen and legs dull whitish. In other respects agrees with *D. vernalis*.

4. *Diraphia maculipennis*, Fitch. The Spotted-winged Diraphia.

This is a smaller species than the preceding, being only about one-tenth of an inch long to the tips of the wings. It is of a tawny-red color, the thorax being shaded more or less with dusky; the antennæ have a broad black band near the tips. The fore-wings somewhat shorter and broader than in either of the preceding species; hyaline, with a broad smoky band at the tips, a spot back of the shoulder, and some freckles near the margin of the same color; the marginal and other veins all white, alternating with numerous black rings. The breast, blackish; legs, dusk or brownish.

Also found on the sweet-flag.

Although apparently of but little importance economically, these species, as well as a number of others, are described, not simply to make the list complete, but as a means of illustrating the genus, so that other

species, if found, may be readily located in their proper place. So far but few species belonging to this family have ever been particularly injurious, either in this country or in Europe, but every now and then the cultivation of a new plant, increased cultivation of one hitherto but little used, or some similar cause, produces the sudden increase of a species previously scarcely noticed.

Genus PSYLLA. (Jumping Plant-lice.)

In this genus the head is strongly inclined and flat above, and usually, if not always, obtusely triangular in front; the front cleft is not generally as distinct and marked as in *Livia*. The eyes are usually globular and prominent, not flattened as they commonly are in the previous genus; ocelli or little eyes distinct, three in number, placed in a triangle on the upper side of the head, one on each side, near the inner border of the eye, the other in front. The antennæ are usually as long or longer than the body, slender and threadlike; the first two joints short and thicker than the others, the third the longest, the last short with two short bristles at the top. Beak very short, arising apparently from the breast, a little behind the first pair of legs; in repose it usually remains nearly perpendicular, composed of three joints, the last very short. The wings thin and transparent, the front pair a little thicker than the hind pair. The hind legs adapted to leaping; the tarsi or feet two jointed.

The eggs of the species, so far as observed, are oval and somewhat conical in form, pointed at one end and rounded at the other, and furnished, usually, at least, with a kind of beak or appendage near the larger end. They are very commonly deposited in a cottony substance, and are usually yellowish or reddish. It is stated, in reference to some species, that the female punctures the bark and places her eggs in the punctures, but this does not appear to be the general rule; at least, the Psylla of figure 1 deposits its eggs in the little crevices and under the little scales around the leaf-bud, turning the beak underneath out of view, and possibly slightly inserting it into the bark to secure the egg in its place.

The larvæ are usually somewhat long in proportion to their width, and often covered with a cottony substance, formed by a secretion which exudes from the pores of the body; but our best known and most common species form an exception to this somewhat general rule. The pupæ are easily distinguished by the two scales on each side, which are rudimentary wings; also by their rounder and more plump form.

Their normal method of passing the winter appears to be in the egg state, but this is by no means the universal rule, as the same species is sometimes found both in the egg and larvæ state during the winter, resembling in this respect some true Aphidians. There are usually several broods during the summer, all produced from eggs deposited by the female after fertilization by the male, agamic generation being apparently unknown in this family. But all the females which deposit eggs do not acquire wings. According to Macquart the eggs deposited in the summer hatch in eight or ten days, soon after which (in the case of the Psylla of the larch) the young larvæ disperse upon the foliage.

The species of this genus are somewhat numerous, and, as in *Aphis*, are usually named after the plant upon which they reside — entomologists taking it for granted that, as a rule, a *Psylla* or an *Aphis* will be found on but one species of plant.

5. *Psylla pyri.* The Jumping Plant-louse of the Pear-tree.

This species has the head but moderately cleft in front, and produces two if not more broods during the summer. The young are not covered with a cottony substance, but are naked.

Fig. 1. PSYLLA PYRI.

The following history of its operations, derived chiefly from Harris, Kollar and others, will, with the description given below, enable the orchardist to detect it whenever it invades his premises:

It infests pear trees, to which its operations appear to be almost exclusively confined, and is found on these, in some of its forms, from May to October in the northern sections, and from April to November in the southern sections, and is probably two or three-brooded, varying somewhat according to latitude. According to Kollar, the European Pear-tree *Psylla* (which is the same as our species, it being imported) comes forth from its winter retreat, provided with wings, as soon as the buds of the fruit trees begin to expand. After pairing, the female lays her eggs in great numbers, near each other, on the young leaves and blossoms, or on the newly-formed fruit and shoots.

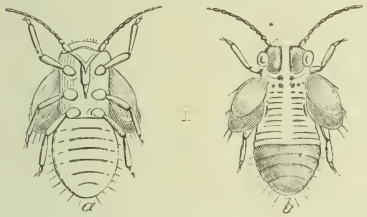

Fig. 2. PSYLLA PYRI—pupa:—*a*, the under side; *b*, the upper side.

The eggs are oblong, yellowish, and look somewhat like grains of pollen. The young insects, soon after they are hatched, resemble young wingless plant-lice (true Aphides), and are of a dark yellow color. They change their skins and color repeatedly, and acquire wing-scales or rudimentary wings; then fix themselves to the bark in rows, and remain sucking the sap until about to undergo their last change, when they disperse among the leaves, cast off their skins and appear in their winged form.

While Kollar is doubtless generally correct in reference to the history of this species, his statement in reference to the eggs and the method of hibernating must be received with some caution. Leon Defour, in his admirable "Researches upon the Anatomy and Physiology of Hemipterous Insects," speaking of the *Psylla* of the fig (*Psylla ficus*), a closely allied species, remarks that he dissected, at the end of October, a female far advanced in gestation, thereby ascertaining the character of the eggs, which are peculiar. That in November he hunted the leaves and summits of the plants on which these insects had been abundant, but failed

to find any eggs corresponding to those of the female he had dissected. Renewing his search with greater care in the early part of December, when all the leaves were off, he succeeded in finding the object of his search. These were found in the little crevices and under the little scales around the buds, but not on the buds themselves. They were naked, without any cottony covering, disposed without order, sometimes isolated and sometimes aggregated. They were ovoid, furnished on the side near the larger end with a short curved beak. When seen in position the beak is not apparent, as it is on the under side and forms the attachment to the bark; they are also sometimes furnished with a minute filament, and are of a reddish-yellow color.

It is very probable that a careful examination of the eggs of the Peach-tree Psylla will show that they are similar to those of the Fig-tree Psylla; also, that they pass the winter in the egg state, aud that their eggs are placed on the branches or bud stalks. It is more than probable that this method is somewhat varied for the summer brood.

As before intimated, this is an imported species, brought from Europe on imported pear trees, and was first observed in this country in 1833. I have no positive knowledge that it has yet reached Illinois, still I think it more than probable that it *has*. So far as observed in this country, the following appears to be their mode of operating: they insert their short beaks in the bark of the twigs and small branches, and pump up the sap to such a degree that the fluid oozes from their bodies, and mingling on the bark with their castings, forms blackish rusty patches. The presence of these pests on pear trees is generally indicated by swarms of flies or ants, which are attracted thither by the sweetish fluid which issues from the Psylla.

As a rule, young trees appear to be more liable to their attacks than old trees.

Remedies.—Wash the twigs with a brush which has been dipped in strong soap-suds, or some noxious mixture of this kind. Harris recommends a mixture of strong soap-suds and flour of sulphur. This must be done before the buds expand.

A better remedy will be, perhaps, to wait until after the eggs are hatched, then apply ordinary soap-suds, whale-oil soap-suds or lime-water, as strong as the plant will bear without injury.

Spec. char.—The young are usually of a dull orange-yellow color; short and obtuse behind; and, as they advance to the pupa state, acquire little wing-scales.

The perfect, or winged individuals, are about one-tenth of an inch long from the front to the tip of the closed wings; the eyes are large and prominent; the head and thorax are of a brownish-orange color, the abdomen greenish; the wings are transparent, ample, and marked with very fine dark veins.

6. *Psylla rubi*, W. and R. The Blackberry Flea-louse.

I know nothing further of this than the short notice given of it in the *American Entomologist*. The writer, a resident of New Jersey, describes its operations as follows: "The suckers upon which this insect occurs in the spring commence to twirl round, and, when not inter-

fered with, make a complete revolution before they resume their usual course. The leaves curl up, and become matted around the curl so as to make a safe harbor for the lice-like larvæ, which, during the summer, appear on the under surface of the leaves. I presume we can get clear of this insect, after the larvæ are produced, by cutting off the curls and burning them."

Although neither of these species has yet been positively detected in Illinois, I have some reason to believe that the former, or some closely allied species, appeared on fruit trees in the vicinity of Chicago last year. I tried, but failed, to procure specimens, so was unable to decide with certainty.

The following species of this genus were described by Dr. Fitch, in 1851, in a catalogue of the insects in the New York Cabinet of Natural History. I give his descriptions as I find them, as I am unacquainted with them. He appears to have been unacquainted with the habits of the first two:

7. *Psylla tripunctata*, Fitch. The Three-dotted Psylla.

Wax yellow, with black back; legs and antennæ, pale yellow, the latter black at the tips; the front wings, transparent (hyaline); nerves, brown, widely margined with smoky yellow beyond the forks, a blackish dot on the middle of the terminal margin of each of the inner apical cells. Length, 0.16 of an inch. Female.

8. *Psylla quadrilineata*, Fitch. The Four-lined Psylla.

Bright fulvous or yellowish; the front wings, hyaline; the nerves, blackish; four whitish longitudinal lines on the middle of the hind thorax (metathorax); abdomen, black with a yellow band at its base. Length, 0.12 of an inch. Female.

9. *Psylla carpini*, Fitch. The Hornbeam Psylla.

Light green or greenish yellow; fore wings, hyaline; nerves, light green. Length, 0.16 of an inch. Male and female. Common on the Hornbeam in July.

10. *Psylla annalata*, Fitch. The Annulated Psylla.

Straw yellow; legs, white; fore wings, hyaline, with the nerves straw yellow; antennæ, black, except the basal portion, which is straw yellow, annulated with black. Length, 0.15 of an inch. Male and female. Occurs on the sugar maple.

The same author mentions another species—

11. (*Psylla urticæcolens*), found on nettles, of which I have not seen the description.

Walker also mentions another species—

12. *Psylla quadrisignata*, of which I have not seen the description.

Mr. Walsh alludes to a species found by himself and Baron Ostensacken, forming true galls on the hackberry; and Dr. Harris alludes incidentally to species found on birch and alder, which have the young covered with a cottony substance, as is usually the case in this genus.

APHIDÆ. (True Plant-lice.)

This family comprises the true Plant-lice, of which Cabbage-lice, Wheat-lice, Woolly-aphis of the apple tree and the Phylloxera of the grape-vine are representatives.

It includes some of the most destructive species belonging to the entire group, and presents one of the strangest physiological facts appertaining to the entire insect class.

The species belonging to it may be distinguished from the *Psyllidæ* by their antennæ, which never contain more than seven joints (the number ranging from three to seven), and being without the two bristles at the tip. From the *Aleurodidæ* they are distinguished by their naked, membraneous, and usually transparent wings. The beak, or elongated mouth, consists of three or four joints, and varies considerably in length, reaching, in some species, to and even beyond the tip of the abdomen, while in others it is quite short. Sometimes it remains more or less perpendicular in repose, while in other species it is pressed against the under side of the body. The antennæ also vary considerably in length, in some extending to and even beyond the tip of the abdomen, while in others they scarcely reach the middle of the thorax. The legs are usually long and slender, with two-jointed tarsi or feet, the hind pair being sometimes elongated, as though formed for leaping, although none of the species seem to possess this power. The head is not so broad as in the preceding family, nor is the thorax as greatly developed in proportion to the size of the abdomen. Occeli, or little eyes, are usually wanting, but are present in a few species.

In one group or section of the family, the abdomen is furnished with two tubes, usually called "honey-tubes," or "nectaries," which arise like little horns from the sixth segment. These appendages serve for the passage of a sweet fluid from the stomach, and appear to act as escape pipes for the excessive amount of sap imbibed by these incessant pumpers. If we examine a properly arranged series of species, we shall find that these tubes gradually decrease in length until the orifice alone remains, and at last this also disappears. This decrease appears to correspond, to a certain degree, with the degradation of the species.

The wings are thin, and usually almost perfectly transparent; they are traversed by few veins, the variation in these affording excellent generic characters; usually, when at rest, they are placed against each other above the abdomen, in the form of a very steep roof, but in many species they are placed horizontally on the abdomen. In the typical species, the fore wings have a strong mid-rib or rib-vein, which runs along very near the front border for about two-thirds the length of the wing, where it comes to the margin; beyond this, where the margin curves, and close to it, are two short arcs; from the posterior side of the

middle third of the rib-vein arise three branches, which run obliquely outward to the hind margin of the wing; the outer, or third branch, gives off from its posterior side two branches, or in other words, forks

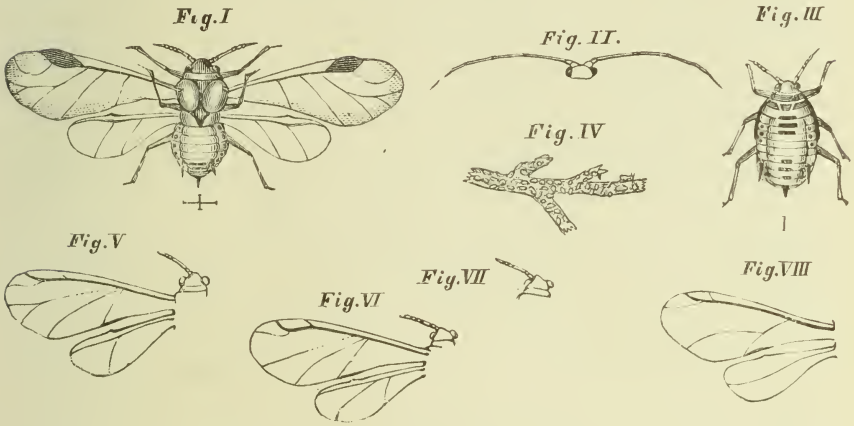

Fig. 3.

I. *Aphis maidis*—winged insect.
II. Head and antennæ of *Aphis avenæ*.
III. *Aphis maidis*—wingless female.
IV. Portion of corn root infested by *A. maidis*.
V. *Thelaxes ulmicola*—showing veins of wings and antennæ.
VI. *Pemphigus populicaulis*—showing veins of wings and antennæ.
VII. (Should be omitted.)
VIII. Wings of Phylloxera.

twice. (Fig. 3, No. I.) In some species the third vein forks but once, (Fig. 3, No. V.;) in others it is simple, without any branches, (Fig. 3, No. VI.;) in others the third branch is almost or quite obsolete, (Fig. 3, No. VIII.;) each variation corresponding with some important difference in the anatomy or habits of the species. It is therefore on account of the material differences in the characters and habits of the species which these variations of the wings indicate that they are selected as a means of classifying and describing these insects, and not that the absence or presence of a single veinlet is considered important in itself.

The hind wings, which are generally (though not always) much smaller than the fore wings, in the typical species have the chief or rib-vein close to the front border, giving off two branches on the posterior side; sometimes there is but one. These branches, both in the fore and hind wings, are usually termed the *discoidal veins*, in order to save a long description by which to identify them. The chief difficulty in using the wing-characters arises from the fact that the very large majority of the individuals we see are without these organs, and do not acquire them during life; yet, as will be seen hereafter, there are few, if any, species

without winged individuals, of one or both sexes, during some portion of the year, although brood after brood lives and dies with all its members wingless. The very great similarity of the wingless individuals of the different groups renders any specific characters derived from their color, markings, etc., often of doubtful value; and this fact has so impressed itself upon the casual and ordinary observers that they usually designate them, no matter where found or what their habits, by the common name, Plant-lice, as though all belonged to one species. Naturalists have therefore sought some more positive method of distinguishing species from each other; this has been found in their habits. It was the belief of the immortal Linnæus that every plant supported a distinct species of Aphis, or, in other words, that a species of Aphis inhabited but one species of plant; and Curtis, the great English entomologist, tells us that, after careful and extensive examination of this subject, he is inclined to subscribe generally to this opinion, adding that, although a species of Aphis is limited to a certain plant, yet there may be more than one species of plant-louse to one plant. As I will speak farther on of the use to be made of these facts, I will omit further mention of them now, except simply to remark, that while a large number of species are naked, there are many others more or less covered when young, or during life, with a cottony or downy substance, on which account they are often called "Woolly Plant-lice," a very appropriate name.

One of the strangest facts connected with the history of these insects is their method of reproduction. But in order to understand this, it is necessary to give a brief account of their life-history through one year.

These insects, as likewise all other species belonging to the Order Homoptera, undergo only a partial metamorphosis or transformation, that is to say, they never are worms or grubs, and never undergo those remarkable changes which transform the grub into a beetle, and the caterpillar into a butterfly. The larvæ and pupæ are similar to the perfect insect in form and habits; and although they frequently cast their skins, and the winged specimens gradually acquire these organs, there is no true dormant pupæ or chrysalis state, as we find in many other insects. Their whole lives are therefore devoted to imbibing food, and producing new broods.

In the autumn, as a general and almost universal rule, the last brood consists of winged specimens, both males and females. These pair, soon after which the male dies; the female deposits her eggs, after which she also dies. Early in the spring, as soon as the sap begins to flow, these eggs hatch, and the young lice at once insert their tiny beaks into the bark or leaf on which they are situated, and begin to pump up the sap. They wander but little, their entire time being devoted to feeding; hence, they grow rapidly, and soon come to maturity. This spring brood consists, generally without an exception, of females without wings. These females, by some strange provision of nature, are capable of reproducing their kind without the intervention of males, and, instead of depositing eggs, as the last fall brood, are usually viviparous, bringing forth living larvæ. These are likewise all females, similar to those from which they

sprang, and they, in turn, produce a similar brood in the same anomalous manner. This process is repeated again and again during the summer and until in the fall, through some six or seven, or even more generations. The last fall brood presents a remarkable change, for it usually consists almost entirely of males and females which acquire wings. These winged females, as previously stated, after pairing, deposit eggs which remain over the winter.

It was formerly supposed that this fall brood consisted entirely of normal males and females, but careful investigation shows this to be a mistake, as there are usually a number of the agamic females among them, showing a tendency to continue the anomalous method of reproduction, which is apparently checked by the approach of the cold season. It has been found possible, by placing the agamic females of the summer brood in a situation of uniform and sufficiently warm temperature, to cause the viviparous generation to go on indefinitely. I have even observed it going on in the middle of winter, in specimens of the Wheat Plant-louse (*Aphis avenæ*), taken from the wheat while snow was on the ground. Instances are on record of this method of generation continuing for four years without interruption.

It is proper to remark that there are some species in which the agamic females do not produce living young, but eggs—the reproduction, in other respects, being similar to that described. It is also a singular fact that there is an intermediate group, in which the young larvæ are brought forth in a very thin and delicate egg-like sack.

How is this mode of reproduction to be explained? is a question that has troubled naturalists from the day of Bonnet, who first discovered it, down to the present time. Leuroenhoek and Cestoni were of the opinion that the supposed agamic females were in fact hermaphrodites. Morren, a professor of the University of Liege, after a careful anatomical examination, apparently set this theory at rest. It was his opinion—a view adopted by the celebrated Owen—that all these changes are brought about by some force concentrated in the sperm cells, or, as the latter has, in substance, expressed it, the spermatic force is transmitted to a mass of germ cells, and these germ cells are the direct excitants of all the changes in the successive generation of cells, until the impregnation of the next ovum. On this theory, the germ stock—for "force," as here used, can mean nothing else—would soon be exhausted, and the reproduction limited. It also requires the transmission of a part of the original germ stock through, sometimes, as many as twenty generations, and with a possible division, according to Owen himself, among more than a million times a hundred million descendants. Another serious objection to this theory is the evidence furnished by Kyber's experiment, in which he kept up viviparous generation for four years, at the end of which the agamic females appeared to have the same power of reproduction as the first brood. I do not fully and clearly understand Huxley's theory, but the chief idea appears to be that of germination or budding, somewhat similar to that observed in some of the Polypi. But his explanation of the production of the ovum in the fall is scarcely satisfactory. Dr. Burnett,

according to Packard, also considers this mode of generation a process of budding similar to that seen in vegetables, and that the whole series, from the spring egg until the end of the last fall brood, is but a single generation resulting from the union which produced the egg in the fall, just as the leaves of the tree, which are renewed each year, are said to be contained in the germ of the acorn, or to result from the union of the staminate and pistillate elements that produced the acorn. The theory is the same as Huxley's in substance; but the illustration is wholly inapplicable, as the leaves are but the organs of the individual, as are the legs and antennæ of each individual Aphis. Parthenogenesis and agamogenesis are terms which, upon their face, are indicative of our ignorance of their meaning, and are used to express a fact without conveying an idea, if we can suppose such a thing possible. Balbiani has revived the old theory of Leuroenhoek and Cestoni, that of internal impregnation or hermaphrodism. He maintains that the embryo viviparous Aphidians are hermaphrodites. He also finds a similar condition in other species considered parthenogenetic, thus striking a heavy blow at this incomprehensible theory.

There are numerous facts in the life-history of some of the lower animals, as strange as it would be for the male principle to be retained under certain circumstances in the female Aphis, and separated under others. This is the simplest explanation that can be found, and it will explain how it is possible to protract indefinitely the agamic reproduction.

But it is not necessary for me to discuss this question further here; for although very interesting to the physiologist and naturalist, it has but little practical value to the farmer or horticulturist, the fact of the rapid multiplication of these insects being the chief point in connection with their reproduction with which he is concerned.

In reference to this point it has been truly said, "There is no tribe of insects so universally distributed or exceeding in numbers the plant-lice." One single individual hatched in the spring, if reproduction should go on unchecked, would by the end of the season produce hundreds of millions; but fortunately for vegetation and for man, nature, as we shall hereafter show, has provided numerous checks and restraining influences.

In reference to the effect they produce upon plants, it is only necessary to state, when numerous, those on the leaves by constantly withdrawing the sap cause these essential organs to curl, blister, and gradually losing their vitality to die and drop; the constant drain of sap from the bark by those that reside on the trunk and branches not only gradually lessens the vitality, but causes it to split, wrinkle or become roughened, thereby rendering the plant liable to disease and injury by climatic influences. Any one who has watched the operations of the Woolly Aphis of the apple tree, are aware how rapidly a little colony causes a little crevice in the bark to expand. Not only is it true, as has been stated by Curtis, that "probably there is not a plant, from the smallest grass to the most stately tree, that is altogether exempt from the visits of these pigmies;" but there is not a part of the plant, from the bud and leaf to the root,

that is altogether exempt. Dig down to the roots of your apple trees or grape vines, and you find them hid away, pumping with never-tiring energy the fresh sap which the little fibrillæ have just drawn from the soil; scrape the rubbish from the collar or base of the trunk, and there you see their downy coats; ascend the trunk, and at each abraded spot you will find a colony located; along the twigs you find other species busily engaged; nor are the leaves any more exempt. Pass from tree to tree in the forest or grove, or from bush to bush in the nursery or garden, from vegetable to vegetable in the kitchen garden, and from cereal to cereal in the fields; enter the green-house or conservatory, or even the tiny window garden, and still you find them at every turn, varying slightly their plans of operation, but all busy at work pumping away the life of the plant on which they are situated.

For want of the works, I am unable at present to give a tabular arrangement of the groups and genera according to the most recent authorities. The following division into sub-families, which is substantially that of Serville and Amyot, may be of use in determining species. I regret that I am unable at this time to give Passerine's arrangement of this family, in which there are more divisions than given here. This is evidently defective, and is only given now as some aid in conveying an idea of the different forms found in the family:

1. Sub-family APHIDINÆ.

   Abdomen furnished near the extremity with two honey tubes, from which a sweet fluid escapes.

2. Sub-family MYZOXYLINÆ.

   Abdomen without tubes or tubercles; species often covered with a cottony substance.

Each of these sub-families contains several genera, the subdivision being carried to a greater extent, probably, by Koch, than any other author.

Sub-family APHIDINÆ.

This sub-family includes such species as the Apple Plant-louse (*Aphis mali*), the Cabbage Plant-louse (*Aphis brassicæ*), the Wheat or Oat Plant-louse (*Aphis avenæ*), etc. The number of species is very large, Walker's Catalogue enumerating three hundred and twenty-six besides those added in the supplement. On this account entomologists have endeavored to split up the old genus *Aphis*, which until recently corresponded exactly with this sub-family; they have therefore seized upon any permanent character, no matter how minute, if confined to what appear to be, by habit and otherwise, distinct groups.

Genus APHIS.

This contains those species which have the head small; the eyes globular and somewhat prominent; the ocelli, or little eyes, usually wanting. Antennæ is long or longer than the body, slender and tapering, somewhat bristle-like, composed of seven joints, the first two of which

are short and larger than the others; the third usually much longer than either the first or second. The beak (apparently) but three-jointed, short, arising apparently from the breast and standing perpendicular. Wings, when present, placed against each other in repose in the form of a very steep roof; they are of the typical form heretofore described, the fore-wings with the three discoidal veins or main oblique branches, the third twice forked; the hind wings with two discoidal veins. (See Fig. 3, No. 1.) The abdomen is furnished near the extremity with two distinct honey-tubes, which stand out obliquely like short cylindrical horns, and which are never reduced to mere tubercles. The posterior legs are much longer than the others. The body is always naked, or nearly so, at least it is never covered with down or the cottony substance common on the woolly lice. They always operate on the surface, never inclosing themselves in galls. They are found chiefly on the leaves of plants or on the tender shoots of the current year, and are extremely common, being diffused upon almost every kind of vegetation. They resemble each other so closely that it is very difficult to detect any marks or differences by which to distinguish them from each other, hence some of the older authors described them simply by stating what plant and the part thereof they infested. As a general rule, those which reside upon the leaves select the under surface, doubtless for the purpose of avoiding the rays of the sun, the rain, and also to escape the observation of birds and other enemies. It is also probable they find the under surface of the leaves more easily penetrated by their tiny beaks.

The constant withdrawal of sap from the tissue on one side of the leaf necessarily dwarfs the growth of this side, and causes the leaf to curl in that direction; or, if confined to a central point, that point of the leaf puffs up, giving the upper side a blistered appearance.

13. *Aphis mali*, Fabr. The Apple-tree Plant-louse, or Apple Aphis.

This, as its name indicates, is the common plant-louse, which is so frequently met with on the tender twigs and leaves of the apple tree. It is more than probable that two or three different species are often confounded under this common name; but practically this is of but little importance, as the habits of the closely allied species are generally very similar, and the remedies to be used against them the same; still, it is well for the horticulturist to be able, if possible, to identify the different species which injure his trees.

It is often quite difficult to determine whether the lice upon American plants are the same as the European species which occur on the same plants, as the descriptions by the early authors are very brief, and drawn up without proper examination and care; but a comparison of the Apple-louse of America with that of Europe shows that they are identical, thereby making it evident that it has been imported into this country. But a change of locality has produced a slight change in the color, which for a time casts some doubt over this question. The following somewhat full description of this species will enable the reader to identify it with sufficient certainty:

The wingless females of the summer brood are somewhat less than one-tenth of an inch long, of a pale greenish color, with the head usually more yellow than the body. Stripes of a deeper green are usually present on the back; sometimes there is but a single middle stripe, with partial transverse ones at the joints of the segments. Eyes, black; beak, antennæ and legs, whitish, with dusky tips; honey-tubes as long as from their base to the tip of the abdomen, dull whitish, with black tips.

The winged males and females measure about one-eighth of an inch to the tip of the closed wings; head and thorax black, the neck usually green, abdomen a bright grass-green, with a row of black dots each side, one dot on each segment; on the under side of the abdomen, at the tip, are two square, brown dots, and above, near the tip, often two or three dark transverse stripes. Antennæ black, scarcely as long as the body; the two basal joints short and thick, almost as broad as long; third joint the longest of all, the sixth only about half as long as the fifth or seventh. Legs, pale dull yellowish or whitish; feet, tips of the shanks and of the thighs, dusky, the hind thighs blackish, except near the base. Wings transparent, but not perfectly pellucid; the stigma dull white.

Dr. Fitch mentions the following variations in color:

Antennæ, brownish yellow; neck not green; thorax, dull green; abdomen, yellowish; abdomen without black dots.

The eggs, which look like minute, oval, shining black grains, are deposited by the female, in the fall, in the little cracks and crevices of the apple twigs, usually as deep as the insect is able to place them. When these insects are very abundant, they are not so particular in reference to hiding their eggs, but scatter them indiscriminately over the bark. These eggs commence to hatch as soon as the buds begin to expand, and the young, which are all females, locate themselves on the tender extremities of the twigs, and on the small and tender leaves, as they unfold, and, inserting their tiny beaks, commence at once to pump up the sap. These reach maturity in about ten or twelve days, and by the viviparous generation before mentioned bring forth another brood of young larvæ, each individual producing two or three daily for a period of two or three weeks, after which the parents perish. The young larvæ, locating themselves close around the mother, commence at once to pump up the sap. This method of renewal, if not interrupted by some unfavorable influence, continues as heretofore described, until the commencement of cold weather in October or November, varying somewhat with the season and locality. The last brood consists of winged males and females. It is estimated that during the existence of the summer broods, that on an average each individual, under favorable circumstances, produces from twenty to forty larvæ; a productiveness that, if not interrupted, would soon destroy all vegetation on which they feed. But, fortunately, there are so many checks upon them that we need have no fears of such a catastrophe as this; the rains and snows of winter destroy a large portion of the eggs, when very numerous and exposed; warm spells in the fall or spring often cause many

to hatch, which are destroyed by the following cold period; their insect enemies, which prey upon them, are very numerous; even the tiny eggs are not overlooked by their ravenous foes.

It is maintained by some orchardists, and I presume they are correct, that some varieties are much more liable to the attack of this species than others. What species have suffered most in Illinois I am unable to say; the Northern Spy and Red Astrachan are said to be among the least liable to be affected.

As is common with other species, the colonies will be found composed of individuals of all ages, mingling and feeding together.

The newly-born are at first nearly white, but soon begin to change to a pale, dull, greenish yellow, gradually assuming the color of the adult, as heretofore given. As the leaves unfold, they gather on the under surface and upon the leaf stalk, and by pumping out the sap and thus check the growth of the under surface, while the upper surface continues to grow and expand, the leaf necessarily curves backwards, often to such an extent that the apex touches the stalk. This forms a shelter for them by which they are shielded from the rays of the sun. This species has occasionally been very abundant in Illinois and Missouri.

Remedies.—I will defer the account of the remedies and parasites until I have concluded the descriptions of the species, for the reason that the remedy for one species is generally equally applicable to another, and therefore it is unnecessary to mention them more than once.

14. *Aphis malifoliæ*, Fitch. The Apple-leaf Plant-louse.

This species, which was first described by Dr. Fitch in 1856, has, very probably, been often mistaken for the preceding, on account of its similarity in habits. In fact, Walker, in the appendix to his catalogue, gives this name as a mere synonym of the former. It is possible it is but a variety of the former; but I here follow Dr. Fitch, and give it as a distinct species.

It is larger in size than the *A. mali*, measuring rather over one-seventh of an inch to the tips of the closed wings; of a shining black color throughout; the legs are also entirely black, an occasional specimen being found in which these are pale or brownish at the base. The wings differ very distinctly from those of the preceding species. They are more slender, and the fourth vein (of the front wings) is relatively shorter and more strongly curved throughout its entire length. In consequence of this curvature, it is nearer the second fork at its base than at its tip. The third vein is but slightly abortive at its base; the second and third veins are parallel with each other, though they are sometimes nearer each other at the tip than at the base. In the former species, the first fork branches from the third vein beyond its middle; in this species, it is given off much nearer the base, at about one-third the distance from the base to the tip; in the former species, the second branch or fork is much less than half as long as the first; in this species, it is usually half as long.

Dr. Fitch, from whose report the above description is chiefly taken, states that he gathered this species from the leaves of the apple trees in

Mercer county, Illinois; two-thirds of all the specimens he gathered at the time belonging to this species. I have noticed the same species in the southern portion of the State, and am inclined to think a close and careful examination of the Aphides infesting the leaves and twigs of our apple trees would possibly reveal the fact that this species is as common and as numerous as the *A. mali*, or, as Dr. Fitch believes, more numerous. The name given implies that it is confined to the leaf, but this, I think, is a mistake; that this is the habit of the species, I think quite probable, and corresponds with my observations, of which, unfortunately, I have no notes, but I certainly have noticed the winged specimens, and if I recollect rightly, apterous individuals also, on the tender twigs.

15. *Aphis cerasi*, Fabr. The Cherry-tree Plant-louse.

This is another introduced species of this numerous family, and, like most of the European or Eastern insects which have been introduced into this country, appears to thrive equally well, if not better, than its congeners, as it is in some sections the most common and abundant species. Goureau describes the species found in France as averaging a little less than one-tenth (0.08) of an inch in length; body, black; antennæ, black, with the middle portion yellowish; abdomen, black; legs, black; the tibiæ, pale yellowish; wings, pellucid. Found on the under side of the cherry tree, which they roll and crisp.

As seen in this country, the wingless females measure about five or six hundredths of an inch in length, the winged individuals measuring to the tips of the closed wings rather over one-tenth of an inch. The winged female is of a shining black color, the abdomen nearly twice as broad as the thorax, giving it an ovoid or egg-shape, with the smaller end in front, which is more clearly shown in the wingless individuals; antennæ, black, about three-fourths the length of the body; the beak, short, black or dusky; legs, black, except the basal half of the thighs and the basal portion of the tibiæ, which are pale or whitish; wings, pellucid; the base, outer margin and rib-vein, white; remaining veins usually dusky; the second vein is about a third farther from the first at its tip than at its base; third slightly farther from the second at tip than base.

The wingless females agree very nearly with the above, so far as relates to the body. The antennæ are whitish, except the two basal joints and apical half; beak, whitish, with the tip only black; legs, white; feet, tips of tibiæ and tips of thighs, black. The abdomen has an elevated lateral margin.

The young larvæ are at first dull white or pale yellow, but grow darker as they increase in age.

This infests the leaves of the cultivated or garden cherry tree (*Cerasus vulgaris*), to the varieties of which it appears to be exclusively confined. They hatch out in the spring, as soon as the leaves commence to unfold. There are a number of broods produced in the same manner, and similar in habits to the other species of the genus; although the summer broods appear to be exclusively females, among them we very often find winged individuals. They often become very numerous, covering

the under side of the leaves with their colonies, and sometimes piled one upon another. Dr. Fitch states that in 1855 the leaves of his cherry trees were literally covered with these lice; that at the time they were most abundant he made an estimate of the number on a single small tree, but ten feet high, and was astonished to find this to be at least twelve millions.

When very numerous, this species does not confine itself to the leaf alone, but extends its colonies to the stalk, and even to the tender twigs and buds and fruit stems, and occasionally to the green fruit. The tough, rigid texture of the cherry leaves prevents them from becoming wrinkled, like those of some other trees; but the margins curl, and there is a tendency to curl backwards. When they attack very numerously the twigs and young leaves, the extraction of the sap causes them to shrivel and die. This species is quite common in Illinois, and, according to Walsh, has been observed on the plum; but this fact appears somewhat at variance with the fact that it will not develop on any species of the cherry except the one mentioned.

16. *Aphis cerasicoleus*, Fitch. Cherry-inhabiting Aphis.

Pale greenish-yellow; antennæ and legs, black; base of the thighs, pale; nerves of the fore wings, dusky; stigma, pellucid white; honey-tubes, quite short. When irritated, the legs and antennæ emit from their pores a bluish-white cotton-like secretion, which remains adhering to them, and resembles fine mould. Length to the tip of the wings, 0.20 of an inch. This is related to the preceding, and is found only on the common black cherry.

17. *Aphis cerasifoliæ*, Fitch.

This is another species, described by the same author, which is found on the under side of the leaves of the common choke-cherry. Its attacks appear to be confined chiefly to the tender leaves at the ends of the twigs, causing their margins to curl downwards and inwards, and changing their color to a yellowish-green, the abdomen being coated with white powder, except a line along the back and the sutures; the legs and antennæ are dull white.

The winged individuals measure about fifteen-hundredths of an inch to the tip of the wings; are black, with a pale green abdomen; the latter has three dark green dots on each side in advance of the honey-tubes, and above these on each side a row of impressed deep green dots, and a deep green stripe along the middle of the back; the honey-tubes reach half way to the tip of the abdomen and are dusky at the tips; the antennæ are about two-thirds the length of the body, dusky or dull green at the base; beak, short; legs, dull white; the feet and four hind femora (except at base), blackish; wings, pellucid; rib-vein, white; rest dark; second fork very short.

18. *Aphis prunifoliæ*, Fitch. The Plum-leaf Plant-louse.

This is much like the Apple-leaf Plant-louse, both in appearance and habits, except that it selects the plum tree as its food plant instead of the

apple tree. It is found on the under side of the leaves of our native and cultivated plums, wrinkling and destroying them. What is said in reference to the history of the Apple Plant-louse will apply, as a general rule, to this species, which does not appear to abound to the same extent as some of the species already named.

The species appears to be quite variable, but the following, taken chiefly from the original description by the author of the species, will probably enable the reader to identify it:

The winged specimens measure about one-seventh of an inch to the tip of the wings; the body is of a shining black, except the abdomen, which is pale green with a black dot on each side of the middle of the two or three anterior segments; a large dusky spot rather behind the middle; tip of the abdomen acuminate; honey-tubes cylindrical, reaching* to the tip of the abdomen. The legs are pale, dull yellowish; antennæ black, except at the base, where they are pale. Wings pellucid; veins dusky, except the rib-vein. The venation does not appear to be as uniform as is usually the case in this genus.

The larvæ are more or less of a greenish-white color, varying according to age. The wingless specimens are oval in form; the average length about one-sixteenth of an inch.

It is possible that this species is but a variety of *A. pruni*, Fab., of Europe, produced from imported individuals; but the fact that it is found on our native plums, as well as cultivated varieties, and some marked differences, certainly justify Dr. Fitch in considering it as distinct.

In addition to what he has said, I may add that a more recent description of *A. pruni*, as found in France, given by Goureau, states that the head and thorax are brown, *and covered with white powder*, which corresponds exactly with Amyot's description. But there appears to be no difference between the larvæ of the two species, except the difference in the length of the honey-tubes, which in *A. pruni* are short, not reaching to the tip of the abdomen.

19. *Aphis persicæ*, Sulz. The Peach-tree Plant-louse.

The Peach-tree Aphis of this country, which is probably the same as that found on peach trees in Europe, lives on the under side of the leaves of the peach tree, to which it appears to be confined, causing them to be thickened, to curl and form hollows beneath, and corresponding crispy swellings above, and ultimately perish and drop off prematurely.

The length of the body is about one-twelfth of an inch; length to tip of the wings, about one-sixth of an inch. The body is greenish-black, with black markings; antennæ, black; abdomen, brownish-yellow, with irregular black markings; legs, brownish-yellow; wings, pellucid.

20. *Aphis amygdali*, Blanch. The Almond Plant-louse.

This species, which is much smaller than the preceding, is found

* Note.—This expression is used simply to denote that these tubes are as long as the distance from their base to the tip of the abdomen, and not that literally they "reach the tip."

attached to the under side of the larvæ of the almond and peach trees. It also produces the same effect upon the leaves as the *A. persicæ*, at least so far as the crisping and wrinkling are concerned.

The body measures only about three-hundredths of an inch in length; to the tip of the wings, about one-twelfth of an inch, or less. The body is entirely green; antennæ, brownish; the legs are green, except the tips of the thighs and tibiæ, which are yellowish; wings pellucid, very long; veins, pale yellow or greenish.

I have not met with this specimen, nor have I seen any notice of its appearance in this country. It is therefore possible it has not been imported, although the great probability is that it has. I give a brief description, so that it may be known if found occurring on the peach trees of our State.

21. *Aphis* (*Rhopalosiphum*) *ribris*, Linn. The Currant Plant-louse.

This species has been transferred by Koch to his genus *Rhopalosiphum*. Whether the species found on our currant bushes is the same as that found in Europe I think somewhat doubtful, notwithstanding the apparent common assent to this conclusion, but will not attempt a discussion of the point at this time. It is usually found on the currant bushes in May and June, and later fixed upon the young shoots and on the under side of the leaf. They cause the latter to crisp, fade and incline at the points attacked; to assume a reddish tinge, producing concavities on the under side, with corresponding convexities on the upper side. Each of these concavities is produced by a little colony, the members of which, working close together, depriving this part of the under dermal covering of its sap, causes it to contract and assume the form of a miniature basin.

The winged individuals measure about, or a little over, one-tenth of an inch in length to the tip of the wings; the body is greenish; antennæ, yellowish or greenish; legs of the same color, except the end of the tibiæ and the tarsi or feet, which are dusky; wings, pellucid.

The apterous individuals measure about one-twelfth of an inch in length; dark velvety green; antennæ not quite as long as the body, setaceous, pale green at the base, dusky at the tips; eyes, black; honey tubes short, pale green. The color varies from dark green to yellowish.

Although common, throughout this country, on the red currant, it has not been observed either upon the gooseberry or black currant. It is often so abundant in the southern portion of the State as to leave scarcely a leaf unblistered.

The foregoing list includes the principal species of this genus so far determined, which are found on cultivated fruit plants. Most, if not all, of them have been observed in Illinois, and therefore deserve the attention of our horticulturists.

22. *Aphis* (*Siphonophora*) *rosæ*. The Rose Plant-louse.

I find no notice of this species in any of the entomological works of this country, except a mere mention of the name, yet that we have a Rose

Aphis must be admitted. Whether it is the same as the European species I am unable, at this time, to state, as I have no specimens at hand.

This species is green, with the antennæ black; sometimes it is entirely black. Length of the apterous individuals about four-hundredths of an inch; to tip of wings in the winged individuals about twice that of the body.

They are found on the tender shoots, leaf-stalks and flower-stalks, especially the last.

Of the numerous species of this group of Aphides, found on ornamental and forest trees, but few have been carefully studied.

Of those which have been determined, I notice briefly the following, some of which vary somewhat from the typical form, and may have been placed in other genera, but if so, I am not at present aware of the fact.

23. *Aphis* (?) *caryella*, Fitch. The Little Hickory Plant-louse.

This species, and the three following, which were originally described by Dr. Fitch, and from whose work our information in reference to them is chiefly derived, are different from any heretofore described. Their wings are not elevated in the steeply inclined manner of the preceding, but are laid horizontally on the back when at rest; their bodies are strongly depressed, and the nectaries are without tubes, being simply honey-pores. Their secretion of honey-dew is much more limited than in the others. They are not so sedentary as those we have previously described, moving about over the surface of the leaf much of their time; nor do they appear to live in colonies like the others. They reside upon the under side of the leaves, chiefly along the mid-vein, in the angles formed by the branch veins.

This species, which is most commonly met with, measures nearly or quite one-eighth of an inch to the tips of the closed wings; is pale yellow; the antennæ white, with alternating black rings; wings, transparent and without spots, their veins slender and pale yellow; legs, yellowish-white. The abdomen is depressed and egg-shaped. The antennæ are longer than the body, tapering and semi-jointed, the two basal joints short and twice as thick as the succeeding ones; third joint longest, the seventh shorter than the sixth.

This approaches very near, in some respects, to Westwood's genus *Thelaxes*, but differs in having the antennae long instead of short, as they are in that genus; and it appears, moreover, that the species belonging thereto are gall-makers. It is probable a genus has been formed for the reception of such species as this, but I have no means of reference thereto at present. The other species are as follows:

24. *Aphis* (?) *punctatella*, Fitch. The Dotted-winged Hickory Plant-louse.

Very similar to the preceding, and possibly but a variety, though considered by Dr. Fitch specifically distinct. The color similar to *A. caryella*, except that the feet are black, and there is a black dot on the base

and another on the apex of the veins of the fore wings; the stigma white, with a brown streak at each end; the second vein is wavy, and at its tip is curved toward the tip of the first vein.

25. *Aphis* (?) *maculella*, Fitch. The Little Spotted-winged Hickory Plant-louse.

Differs from *A. caryella* in having only a slender black ring at each articulation of the antennæ; the feet, and a band near the tips of the hind thighs, blackish; the fourth vein of the fore wing with a black dot on its base and a dusky one on its apex; the first vein, apical third of the second vein, and the first and second forks, broadly margined with smoky brown; second vein wavy and parallel with the third till near its tip, where it curves toward the first vein.

26. *Aphis* (?) *funipennella*, Fitch. The Little Smoky-winged Hickory Plant-louse.

Is of a dull yellow color, with blackish feet, and the wings smoky, with robust brown veins; the rib-vein much more distant from the margin the first half of its length than in the other species.

27. *Aphis* (?) *marginella*, Fitch. Little Black-margined Hickory Plant-louse.

Pale yellow; antennæ white, except at the base, and four bands which are black; a deep black band in front, between the eyes, and continued along each side of the thorax to its base; fore wings pellucid; stigma, outer margin and rib-vein coal black; first vein with a black dot on its base; fourth vein, black; rest, colorless; outer margin of the hind wings, black. Length to tip of the wings, about one-seventh of an inch.

I follow Dr. Fitch in giving these as distinct, as he has described them; but I think it more than probable they are but varieties of *A. caryella;* possibly *A. marginella* may be distinct.

The following species of this group are chiefly pests to the gardener and farmer, often doing serious injury to the succulent vegetables of the former and the grain of the latter:

28. *Aphis brassicæ*, Linn. The Cabbage Plant-louse.

This species was doubtless introduced from Europe at an early day, and has spread over the country wherever cabbage is cultivated. It is found not only on cabbage proper, but on the varieties of this useful vegetable, and on the leaves of the ruta-baga, turnip, etc. As a general rule, they do not require attention, but occasionally, in a season favorable to their development, they become so numerous as to seriously affect the growth of these vegetables.

The wingless individuals, which are usually located in clusters, are pale green and are dusted over with a fine gray powder; their antennæ and legs are smoky or blackish, and in some individuals there is a row of minute black dots along each side of the back.

The wingless females are larger than the others, though less than one-tenth of an inch in length, slightly powdered and generally more of a yellowish-green than the males; the eyes, two large spots on the top of the head and one on each side of the neck, black; the honey-tubes short and dark, as are also the legs.

The winged individuals measure about one-seventh of an inch to the tip of the wings, and half that length to the tip of the abdomen; dull green or pea-green; head and throax black above, abdomen more or less varied with black. The honey-tubes, though not long in this species, are distinct; antennæ about two-thirds the length of the body. Winged specimens are met with throughout the season.

29. *Aphis rumicis*, Linn. The Bean Plant-louse.

This is said to be one of the most injurious species of the entire group, not confining its attacks to a single plant, but spreading its colonies over a variety of species, on which account it has received a variety of different specific names, which Mr. Walker has enumerated as follows: *A. rumicis*, Linn.; *A. craccæ*, Linn.; *A. atriplicis*, Linn.; *A. fabæ*, Scop.; *A. genistæ*, Scop.; *A. acetosa*, Linn.; *A. aparines*, Fabr.; *A. euonymi*, Fabr.; *A. papaveris*, Fabr.; *A. hortensis*, Fabr.; *A. vicæ*, Fabr.; *A. chenopodii*, Schrank; *A. thlaspeos*, Schrank; *A. galliscabri*, Schon.; *A. armata*, Hans.; *A. laburni*, Kalt.; *A. dahliæ*, Mos.*

These names indicate the various plants on which it has been observed—as, the dock (*Rumex*), the tufted vitch (*Vicia cracca*), the garden orache (*Atriplex*), the bean (*Faba*), the dyer's broom (*Genista*), the field sorrel (*Rumex acetosa*), the bedstraw (*Galium aparine*), the burning-bush (*Euonymus*), the poppy (*Papaver*), the pig-weed (*Chenopodium*), the shepherd's purse (*Thlaspi*), the dahlia (*Dahliæ*). They also show that not only is it not confined to a single species, or a single genus of plants, but feeds alike upon those belonging even to different orders, thus setting at nought what is considered as an inflexible rule in regard to all other species. I think it more than probable the facts presented by this will ultimately lead to a more thorough examination of other species, and show that many which are now considered as distinct species are but varieties.

It may be asked, How is it known that these various supposed species are but varieties of but one species? By the peculiar marks and characteristics which distinguish it from all other species. Yet it is possible that some of these are after all distinct, and that Koch is right in restoring them to their position as such.

Winged females glossy black, one-twelfth of an inch to tip of the abdomen, and one-sixth of an inch to the tips of the closed wings; antennæ shorter than the body, (Dr. Fitch says half the length of the body, but this appears to be the minimum, as it is sometimes nearly as long as the body,) undistinctly seven-jointed, third longest, sixth shortest of all,

* Note.—Koch has removed several of these as distinct, and Walker has accepted the change in the Supplement to his Catalogue.

except the first two. The ovipositor distinct; honey-tubes, short but distinct. Legs black, tibiæ pale. Wings pellucid, veins slender and dusky, third vein abortive at the base.

The wingless females are also black; the abdomen frequently showing whitish powdery dots along each side of the back. It is the pupa that presents the peculiar and marked character of the species. When this state is fully attained it equals in length the body of the winged individuals; is oval in shape, with the sides nearly parallel, the anterior end bluntly rounded and the end of the abdomen tapered to an obtusely attenuated point. The head varies in color from black to dull green or olive, dusted over with white powder; thorax, with the anterior half, narrow, black and powdered; posterior half twice the width of the anterior part, dark greenish or olive color; the abdomen black, with white primrose (or powdered) spots along each side of the back. The eggs, when first deposited, are greenish, but soon become black; are very minute, regularly oval, and not more than one-fiftieth of an inch long.

These insects usually select the center of the under side of the leaf as the point for locating colonies, which usually consist of but, comparatively, few individuals. Dr. Fitch thinks this species passes the winter in the perfect winged state as well as in the egg state.

30. *Aphis circæzandis*, Fitch.

Is a species found on the leaves of *Galium circæzans*. Length about one-eighth of an inch to the ends of the wings; head and thorax, black; wings, pellucid.

31. *Aphis* (*Siphonophora*) *avenæ*, Fabr. The Grain Plant-louse.

This, which has long been known on wheat, oats, barley and rye, has doubtless been imported from Europe, where it has been described under various names, as *A. avenæ*, Fabr.; *A. granaria*, Kirby; *A. cerealis*, Kalt., and *A. hardei*, Kyber. Occasionally, of late years, it has become quite too common upon the wheat crops of our Illinois farmers, sometimes considerably affecting the yield of this cereal. In 1866 it appeared in various parts of the State in sufficient numbers to do considerable damage; and again this fall (1876) it has made its appearance in the young wheat in Illinois.

They are seen during the season in three different forms, the winged females, the wingless females, which are far more numerous than the winged ones, and the young wingless larvæ. Pupæ, with minute rudimentary wings like scales, may also occasionally be seen. They are furnished with moderately long honey-tubes, and the females have also a distinct ovipositor or tail-like process at the end of the body; the males are destitute of this process.

In England, according to Curtis, this species presents the following characteristics:

The *wingless female* varies in color, being red, green, brown or yellow; the front is convex in the middle, with a distinct lobe each side; antennæ, black, nearly as long, or longer, than the body; knees, tarsi and tips of the tibiæ, black.

Winged female brown, rarely green; abdomen with a row of black dots on each side, tip yellow; wings pellucid; veins pale yellow.

In France, as described by Goureau, the wingless individuals are one-tenth of an inch long, green; eyes, tips of the antennæ, of the femora and of the tibiæ, black. Winged specimens one-sixth of an inch to the tips of the wings; head and thorax a testaceous yellow; abdomen, green; wings, transparent, with a brownish band between the border and the subcostal vein; rest as apterous individuals.

Dr. Fitch describes the winged female as follows: "It is 0.10 long, or to the tip of the closed wings 0.20 of an inch. Head transverse, convex in front, rectilinear at base, dull pale yellow. Eyes jutting out from each side of the head, globular, usually of a rusty reddish color. Eyelets or ocelli three, appearing like minute glassy dots placed at the angles of an imaginary triangle, far apart, one near the upper edge of each eye, and the third one forming a slight projection upon the middle of the forehead. Beak oppressed to the breast, arising between the base of the fore legs and reaching half way to the middle legs, pale green, its tip black. Antennæ long and slender, about equaling the body in length, tapering, black, their bases obscure yellowish, seven-jointed. Thorax nearly globular; collar much narrower, narrowing forward, a little longer than the head, grass green; remainder of the thorax dull pale yellow and shining, above, with a large egg-shaped black or brown spot on each side, between the forward ends of these spots a small oval one, which reaches forward to the collar, these three spots being elevated, convex and polished; sides beneath the wing sockets, with an oval brown spot, paler than those on the back, and placed obliquely. Breast dull black between the four anterior legs and often dusted with a glaucous powder. Scutel dull pale yellow, appearing as an elevated, smooth, transverse ridge of a semi-circular form above the base of the abdomen. Abdomen broad oval, rounded at tip, grass green, with a row of about three blackish dots on each side forward of the base of the honey-tubes. Honey-tubes black, as long as to the tip of the abdomen, slightly thicker towards their bases. Tail very pale greenish-yellow, straight along its upper, and convex on its under side. Legs long and slender, hind pair longest; thighs very pale, greenish, towards their middle becoming yellowish, and beyond this black; shanks bearded with fine short hairs, pale dull yellow, their tips black. Feet short and slender, but half as thick as the shanks, obscurely two-jointed and with two small claws at their end. Wings held together in a steep roof over the body, transparent, with slender brown veins, the rib-vein thick and sulphur yellow, as is the stigma spot also, the veins bounding its two sides being brown; inner edge with the customary blackish streak extending forward for a short distance from the tip of the first vein. First and second veins more than twice as far apart at their tips as at their bases. Third vein as far from the second at its origin as

this is from the first, nearly parallel with the second vein, very slightly farther from it at its tip than at its base, its fork given off forward of its middle, and this fork (?) sending off the second one beyond its middle. Tip of the first fork twice as far from the tip of the third vein as from the second fork. Fourth vein strongly curved through two-thirds of its length and then straight and parallel with the second fork, its tip nearer the tip of the second fork than this is to the first fork, and almost twice as far from the tip of the rib-vein as from the second fork."

Dr. Fitch inadvertently states the first fork or branch of the third vein "sends off the second one;" it is the continuation of the third vein that sends off the second fork, as in all other species of this genus. The raised black spots on the thorax are very distinct.

In the spring, before the heads are formed on the grain stalk, they live snugly scattered over the leaves and stalks, the young lice as soon as they are born wandering away from their parents without any apparent disposition to form colonies. But as soon as the heads begin to appear, these insects, led by a mysterious instinct, forsake all other parts of the plant and congregate upon the heads, fixing themselves, head downwards, upon the base of the chaff which envelops the kernel. Now the young lice, instead of wandering away, fix themselves in compact colonies around their parents. This change in habit, it is asserted, is accompanied by a change in color, that while feeding on the leaves they are grassy green, but when they change to the heads they gradually acquire an orange color, and ultimately change to the colors mentioned.

But so far as those found on the leaves and stalks are concerned the description given does not appear to be uniform, for I find upon the wheat this winter, and have now (Dec. 16) before me living specimens, winged and apterous. The apterous specimens are more or less brownish, thus agreeing with the characters given by Curtis. The only winged specimen before me agrees with Dr. Fitch's description, except that the head is shining black; the antennæ nearly as long as the body, not pale at the base; the front of the thorax greenish-yellow, back of the thorax black, rest greenish-yellow; honey-tubes do not quite reach the tip of the abdomen; wings perfectly pellucid; the rib-vein a nearly transparent honey yellow, rest of the veins colorless. The arrangement of the veins corresponds with that given, with the correction heretofore mentioned; the abdomen greenish-yellow, slightly flecked with fuscous in addition to the lateral spots.

But this is, undoubtedly, the species now under consideration, as is shown by the form of the head and thorax, the oval elevated spots on the thorax, venation of the wings, and other undoubted characters. This identification, which fortunately I am now able to make, enables me to add something to the history of the species. When the winter wheat appears above the ground in the fall, it passes from its hiding place at this time, wherever that may be, probably in the same way that it does from the winter wheat to the spring wheat and oats in the spring, that is by the winged individuals.

Here they work upon the leaves and stalks singly, while the weather is not too cold, but when winter appears they move down toward the ground, some of them, at least, entering the soil and feeding upon the sap of the roots. At any rate, I find the apterous ones at this time working upon the roots, but at the same time I find a winged individual above ground. I have also observed them heretofore at the root of the wheat, late in the winter, while snow was on the ground; and, what somewhat surprised me, I found them busy at work under the snow, and the apterous females bearing well-formed larvæ. I am, therefore, led to believe that in this latitude the species passes the winter in other than the egg state. This will also, probably, be found true wherever winter wheat is grown.

32. *Aphis maidis*, Fitch. The Maize or Corn Plant-louse.

This species, which appears to be different from the one infesting the maize in Europe, was formerly supposed to confine its attacks to the stem or peduncle which bears the ear, the most vital point, so far as yield is concerned, of the entire plant; but Mr. Walsh has presented reasons for believing it also attacks the roots, as stated below. When once established, they usually remain until the corn ripens or is cut down.

The larvæ are either green or yellow; the latter being those which ultimately acquire wings; before changing into pupæ, they usually acquire a pale reddish color, and are dusted over with white powder.

The wingless females are dull, blackish, tinged with green, and sprinkled with fine whitish powder; head, and generally two bands on the thorax, black; the abdomen is usually marked with black spots along the sides; honey-tubes rather short; autennæ, black, and not more than half as long as the body. Wing females, similar; length of the body, six hundredths of an inch; general color, black; the abdomen, dark greenish, with black dots along each side and three black bands at the tip.

It is somewhat strange that maize should have a different aphis in Europe from that which infests it in America.

Mr. Walsh found a species of aphis infesting the roots of corn, which he is inclined to believe is identical with the one now under consideration. The general color, both of the pupa and perfect insect, is pale green; the female pupa usually has three short, transverse dark lines on the thorax, and three similar ones on the abdomen. It is figured in the fifth volume of the Transactions of the Illinois State Agricultural Society. If the figure (No. I., page 149) of the winged individual is correct, the antennæ are unusually short, scarcely reaching the tip of the thorax; the honey tubes are also rather short; the first discoidal vein is farther from the second than the second is from the first, and the stigma is prominent and pointed at each end. He states that the pupa is dusted over with a whitish bloom like that of a plum, and with dusky markings.

He found these quite abundant on the roots of corn in June, and was led to believe from his observations that it is their normal habit to reside on this part of the plant, being driven to the stem later in the season in search of food, as the root becomes hardened.

33. *Aphis humuli*, Schrank. The Hop Plant-louse.

This species is probably identical with the Hop Aphis of Europe, and does more injury to the plant it attacks than is done by any other aphis to the plants which they infest. They are found on the under side of the leaves of the hop, often in immense numbers; they sometimes cover the upper surface of the leaves with their honey-dew to such an extent that it afterwards changes to a sooty black, giving rise to what is called "black blight."

The young lice are of a yellowish-white color, with black eyes, but as they increase in age and size they change to green. The winged individuals are green, with the back of the thorax and the breast black; the abdomen has a row of black dots each side, and some transverse black bands; legs, yellowish, except the feet and joints, which are black. The antennæ nearly as long as the body, black, except at the base; honey-tubes rather long, and dusky at the tips; wings transparent, with the stigma greenish-gray, and veins brownish.

34. *Aphis rudbeckiæ*, Fitch.

Is a large, red plant-louse, which often congregates in immense numbers, head downwards, on the stalks of the Golden-rod, and appears to be a different species from *A. solidaginis*, Hausm., which infests the stems of the European Golden-rod (*Solidago virgaurea*). Red; antennæ and legs black, basal half of the thighs yellow; honey-tubes equaling the length of the tip of the abdomen; stigma of the fore wings, yellowish; veins, brown; the marginal or costal one, sulphur-yellow. Length, 0.20 of an inch. It also infests *Rudbeckia laciniata*.

15. *Aphis* (*Siphonophora*) *lactucæ*, Linn. The Lettuce Plant-louse.

There are more than one species of plant-louse found on the common garden lettuce (*Lactuca oleracea*), but the others, or rather the other species is easily distinguished from this, as it belongs to the Woolly Aphis group and operates chiefly on the roots, while this operates on the leaves and belongs to the typical species of *Aphis*, which has caused Koch to remove it to the genus indicated. I take it for granted that our species is identical with the European species. It is very variable in its markings, hence we are led to rely chiefly upon habits in determining it. I give here a description of some of the varieties of the European species, that the readers may have the means of comparison.

The Viviparous Winged Female.—Grass-green; head and chest, black above and below; front and hind border of the prothorax, green; a row of black spots on each side of the abdomen; antennæ, black, a little longer than the body; beak, pale yellow, with a black tip; honey-tubes about one-fourth the length of the body, black; legs, pale yellow, rather long; feet and tips of the thighs, black; wings, transparent, much longer than the body; rib-vein, yellow; branch veins, brown.

There is also a smaller gray variety, with the fore chest pale red, middle chest black, and honey-tubes yellow.

The wing characters are as follows: Distance between the first and second discoidal veins, at the base much less than half that between them at the tips; third a little farther from the second at the tip than at the base, and as far from the second at the base as the second is from the first; the first veinlet (fork vein) very much nearer to the second at the tip than it is to the third vein.

36. *Aphis polygoni* (*?*). The Knot-weed Plant-louse.

Is found on the Spotted Knot-weed (*Polygonum persicaria*). There are two species found on the knot-weed in England, the *Aphis polygoni*, Walk., and the *Aphalara polygoni*, Forst.; whether this is identical with either, I am unable to say.

37. *Aphis viburni* (*?*), Fabr. The Cranberry Plant-louse.

Found on the fruit stems of the High Cranberry (*Viburnum opulus, var. Americanum*). It is possible this may be a different species from that named by Fabricius, which he says infests the leaves as well as the stems. The veining of the fore wings of Fabricius' species is as follows:

The distance between the first and second discoidal veins at the tips more than twice that between them at the base; third a little nearer the second, at the base, than the second is from the first fork (or veinlet).

38. *Aphis candicans* (*?*). The Balm of Gilead Plant-louse.

Infests the base of the leaves of the Balm of Gilead, and appears to be different from the *A. populi* of Linnæus. But in order that this may be determined, I give here briefly the characters of the latter, which has been transferred by Koch to his genus *Chaitophorus*.

The rib-vein hardly approaching the front border and then very slightly diverging from it; its angle very blunt and scarcely perceptible; the first discoidal vein very oblique to the rib-vein, from its source to the base of the wing is less than three-fourths the distance from its tip to the base of the wing; second vein more oblique than the first, more than three times as far from the first at the tips as at the base; the third vein obsolete at the base.

The position of the rib-vein, the obliquity of the discoidal veins, and the obsoleteness of the third at the base, together with a slight difference in habits, are doubtless the reasons why this has been removed to another genus.

39. *Aphis berberidis*, Kalt. The Barberry Aphis.

Found on the under side of the leaves of the Barberry. Black; the breast and abdomen pale yellow, tip black; legs dusky. Larva and pupa pale, with a green or black stripe on each side of the back parallel with the outer margin. Length, 0.10 inch. Our species is probably identical with that found in Europe.

40. *Aphis asclepiadis*, Fitch. The Silk-weed Aphis.

Inhabits the under surface of the leaves of the common Silk-weed. Black; abdomen pale green; two rows of impressed dusky dots on each side, three in the lower and five in the upper row; honey-tubes nearly reaching to the tip of the abdomen; veins of the fore wings brown, the costal or marginal one whitish; stigma smoky-white. Length, 0.15 inch.

41. *Aphis cornifoliæ*, Fitch. The Dogwood-leaf Aphis.

Inhabits the under side of the leaves of the Dogwood (*Cornus paniculata*). The apterous females are black, somewhat powdered or mealy, and obovate in form; legs pale yellow, feet black; antennæ pale yellow, tips black; honey-tubes nearly reaching the tip of the truncated abdomen. Length, 0.05 inch to tip of the abdomen.

42. *Aphis cratægifoliæ*, Fitch. The Thorn-leaf Aphis.

Found on the leaves of the Thorn (*Cratægus punctata*), which it corrugates. Black; abdomen green, with a row of blackish dots along each side; veins of the fore wings whitish, black at their tips; tibiæ or shanks, except at their tips, and base of the thighs, green; honey-tubes equaling nearly half the distance to the tip of the abdomen. Length, 0.15 inch.

43. *Aphis betulæcolens*, Fitch. The Birch-inhabiting Aphis.

Sulphur-yellow; antennæ deep black, except the two basal joints, which are sulphur-yellow; the following joints are white at their bases; nerves of the fore wings black, the costal sulphur-yellow, the base of the forked vein hyaline; stigma transparent yellow; honey-tubes very short. Length, 0.18 inch.

44. *Aphis aceris*, Linn. The Maple-tree Aphis.

Our species, which occurs on *Acer Pennsylvanicum*, appears to be identical with the European species.

45. *Aphis sambucifoliæ*, Fitch. The Elder-leaf Aphis.

Found on the under side of the leaves of the Elder. Black; tibiæ and base of the thighs pale; veins of the fore wings black, the forked one transparent at its base; the stigma dusky. Length, 0.15 inch.

46. *Aphis pinicolens*, Fitch. The Pine-inhabiting Aphis.

Found solitary on the Pine. Straw-yellow, densely covered with white powder; antennæ black, bases pale, with a dusky ring; fore wings with a fuscous spot on the tip of each vein; veins brown, hyaline at their bases, the costal one straw-yellow; honey-tubes very short. Length, 0.25 inch. This probably belongs to another genus.

47. *Aphis populifoliæ*, Fitch. The Poplar-leaf Aphis.

Inhabits the under side of the *Populus grandidentata*. Of a chestnut-brown color, mealy; legs hairy, black, pale brown above the knees; veins of the fore wings brown, stigma smoky-yellow, margined with black; black with two rows of impressed, squarish, fuscous spots; on each side two rows of impressed dots; honey-tubes equaling a third of the distance to the tip. Length, 0.22 inch.

Genus LACHNUS.

This genus was established by Illiger, to receive those species which agree in general appearance with the species of *Aphis*, but have the honey-tubes much abbreviated or reduced to mere tubercles. In addition to this difference, the antennæ are only six-jointed, usually shorter than the body, and sometimes thread-like or filiform. The beak is usually longer than in the previous genus. They usually inhabit the twigs and small limbs rather than the leaves, and, according to Dr. LeBaron, generally have the abdomen dotted, though there are exceptions to this rule. The species are far less numerous than in the preceding genus, and, so far as I am aware, have never infested the fruit trees in this country.

48. *Lachnus dentatus*, LeB. The Spotted Willow Aphis.

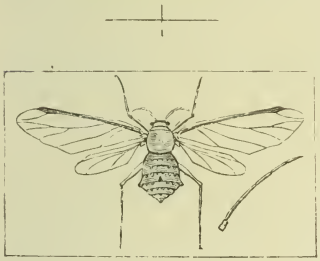

Fig. 4.

As Dr. LeBaron—who first named this species — has already described it in his Second Report, it will be unnecessary for me to do more than simply mention some of the chief characters as there given, as I have not studied the species.

It is found in October and November, in colonies, on the under side of the branches of the gray willow; and occasionally, but apparently accidentally, on the trunks of small nursery apple trees. The winged individuals measure about one-sixth of an inch long; the wings expanding about half an inch. Black; abdomen dark ash color, with six transverse rows of black dots. Antennæ as long as the head and throax. Front wings with a very long stigma; the third vein with two forks, as usual in this genus as well as the preceding. Honey-tubes reduced to mere tubercles. Thighs dark honey-yellow, broadly tipped with black; tibiæ dusky reddish at the base. The dots on the abdomen are very distinct in the full grown individuals; the intermediate rows have six dots in a row. Just behind the middle of the abdomen, and occupying the place of the two middle dots in the fourth row, is usually a somewhat conspicuous, black, conical protuberance. When crushed, they stain the fingers red.

49. *Lachnus salicicola*, Uhler. The Plant-louse of the Willow.

This is the *A. salicti* of Harris, but as this specific name had already been given by Schrank to a European species infesting the willow, Uhler

changed it to the name we have here given. It is evidently very closely allied to the preceding, yet appears to be distinct. It is a large species, although smaller than *L. dentalus*, and lives on the branches and twigs of various kinds of willows, clustering together on the under side, often in great numbers. The winged individuals appear about the first of October. The body measures about one-tenth of an inch in length; to the tips of the wings about two-tenths. They are without the conical projection, or stylet, found in most of the species already described, at the tip of the abdomen; the honey-tubes are much shortened. The body is black, and the abdomen is without the dots which are so often present in this genus. The wings are pellucid, but the veins are yellowish, as are the legs, the honey-tubes and the first joint of the antennæ. As in the preceding species, when crushed, it gives out a stain of reddish or deep orange color, showing such a strong resemblance to that species in this respect, as well as in its habits, that, were it not for the marked differences in coloration and size, we should not hesitate to consider them as but varieties of one species, which further evidence may yet prove to be the case.

50. *Lachnus salicelis*, Fitch.

Under this name Dr. Fitch describes another species which is found on the willow. It is smaller than Harris' species, and, like it, appears also to be without spots on the abdomen, and in all probability is but a variety of that species. Black; tibiæ and base of the antennæ pale; base and costal margin of the fore wings yellowish-white. Length, .08 inch. Resides on the succulent twigs.

51. *Lachnus caryæ*, Harr. The Hickory Plant-louse.

This is the *Aphis caryæ* of Harris, and is found on the pig-nut hickory (*Carya porcina*), clustered on the under side of the limbs and twigs during the summer. It is perhaps our largest species, measuring one-fourth of an inch to the tip of the abdomen, and above four-tenths to the tips of the wings. The honey-tubes are quite short, and there is no stylet at the end of the abdomen. The body appears to be slightly powdered or pruinose; and the abdomen is marked with four transverse rows of black dots; the upper side of the throax and the veins of the wings are black, as are also the tibiæ and tarsi; the thighs are reddish brown; the antennæ are dark and clothed with black hairs.

52. *Lachnus strobi*, Fitch. The White Pine Lachnus.

Found in colonies on the ends of the branches of the white pine, and probably also on other pines, puncturing them and extracting their juices; giving to the bark upon which they are located a peculiar black appearance. The winged individuals measure two-tenths of an inch to the tips of the wings; they are black, hairy and sometimes slightly dusted over with a white powder, with a row of white spots along the middle of the abdomen; the thighs are pale yellowish at base; the fore wings hyaline with black veins, the third being exceedingly slender. The

wingless individuals are about one-eighth of an inch long, brownish-black, with a white line along the middle of the throax, and white spots along each side of the abdomen, but the latter are sometimes very dim, or wanting; antennæ pale with the tips black. Dr. Fitch says it is a very common thing to find winged individuals with the third vein of the fore wing but once forked, showing the very close relation of this species to the Woolly Plant-lice (*Eriosoma*). It is possible that this may yet prove to be identical with the *Lachnus pini* of Europe.

53. *Lachnus caricifex*, Fitch. The Larch Aphis.

This species is usually found solitary on the small twigs of the American larch (Tamarack), stationed chiefly in the axils of the tufts of leaves. The wingless individuals, which are the only ones as yet described, are of a brownish color, often with a slight coppery tinge; length, about one-eighth of an inch; with a dull white line along the middle of the back, and a similar whitish band at the sutures of each of the abdominal segments; in these bands there are three black punctures on each side of the middle; the short tubercular honey-tubes deep black; the under side dull white and dusted with white powder; the legs pale, with the feet and knees black. According to Dr. Fitch, from whose report the above description is taken, many of these insects were noticed on a particular tree in May, but no winged ones among them. Many of them were accompanied by four or more young, huddled close around the base of the sheath from which the leaves arise. These were dull yellow, with two brown spots on the abdomen, near the base.

54. *Lachnus abietis*, Fitch. The Spruce-tree Lachnus.

Occurs on the *abies nigra*. The wingless females are pubescent, broad oval, blackish, clouded with brown, with a faint ashy stripe on the back; under side mealy, with a black spot near the tip; antennæ dull white, with a black ring at the tip of each joint. Length to the tip of the abdomen, 0.15 inch. Whether this is the *L. abietis* of Walker or not, I am not at present able to state.

55. *Lachnus quercifoliæ*, Fitch. The Oak-leaf Lachnus.

Found on the leaves of the white oak (*Quereus alba*). Light yellow; antennæ watery-white, with a slender black annulus or ring at the tip of each joint; fore wings with a blackish dot on the base of the curved apical vein; stigma whitish. Length to the tip of the wings, 0.15 inch.

56. *Lachnus alnifoliæ*, Fitch. The Alder-leaf Lachnus.

Found on alder leaves. Green; antennæ greenish-white, with four black rings; legs greenish-white; feet, knees and a line on the posterior side of the tibiæ, black; wings hyaline, the discoidal veins black. Length, 0.10 inch.

57. *Lachnus ulmi*, Linn. The Elm Lachnus.

On the under side of elm leaves.

58. *Lachnus populi*, Linn. The Poplar Lachnus.

On the under side of the young leaves of the *Populus grandidentata*.

In addition to the species already named which belong to this subfamily, (*Aphidinæ*,) I mention the following European species found on cultivated plants, which have been introduced into this country, and which, if they have not already brought them, will sooner or later bring hither their native plant-lice.

59. *Aphis dauci*, Fabr. (*A. plantaginis*, Schrank.) The Carrot Plant-louse.

Infests the umbels of the carrot.

60. *Aphis pastinacæ*, Linn. (*A. capreæ*, Fabr.) The Parsnip Plant-louse.

Infests the stems and leaves of the parsnip.

61. *Lachnus pini*, Linn. The Pine-tree Lachnus.

62. *Lachnus abietis*, Walk. (*Aphis abietis*, Walk.) The Fir-tree Lachnus.

Possibly same as *L. abietis*, Fitch.

63. *Lachnus laricis*, Walk. The Larch-tree Lachnus.

64. *Lachnus juniperi*, Fabr. The Juniper Lachnus.

65. *Siphonophora absinthii*, Linn. (*Aphis tanaceti*, Linn.)

Found on the stems of common tansy, and some other aromatic plants.

66. *Siphonophora rubi*, Kalt.

Found on blackberry bushes, or plants closely allied thereto.

67. *Siphonophora fragariæ*, Walk. The Strawberry Plant-louse.

NATURAL ENEMIES.

There is perhaps no other group of insects in the entire class that has as many natural and inveterate foes, as that which includes the true Plant-lice. These species appear to be designed by nature to extract the sap of plants and fit it for the nourishment of other insects. Living entirely upon the sap of the leaf, twig or stem on which they are deposited, and having little occasion for exercise or movements, and led by instinct to avoid as far as possible the direct rays of the sun, their external envelope

or dermal covering, in fact all parts of the body, remain soft and tender, and their rapid imbibation not only constantly keeps them filled with fluids, but is so great in proportion to their capacity that nature has provided them with nectaries or honey-tubes as escape valves for the overplus. They are therefore most dainty food for the rapacious insect appetite, and their enemies are numbered by scores; in fact, nature seems to have prepared entire families of insects as a special means of keeping them in check, and without which vegetation would soon, in a great measure, succumb beneath their attacks.

These enemies are found in the Orders *Coleoptera* (Beetles), *Neuroptera* (Lace-wing Flies, etc.), *Hymenoptera* (Bees, Wasps and Wasp-like insects) and *Diptera* (Flies and Gnats).

Their beetle foes (*Coleoptera*) are confined chiefly to the *Coccinellidæ*, or Lady-bird family. These beautiful little beetles, so well known to every one by their hemispherical shape and bright red or yellow color with black dots, or black color with red or yellow dots, are most inveterate Aphis eaters, both in their larval and perfect states. Their eggs, which are smooth, oval and usually a bright yellow color, may frequently be met with on the under surface of leaves, in clusters of from two to three dozen, placed close together and gummed by one end to the leaf.

These hatch in a few days, producing usually small blackish larvæ, which are somewhat elongate in form, and narrowed posteriorly, and possess six legs situated on the three anterior segments. As they grow they gradually assume the colors indicative of their specific differences, and they also develop on the sides, and in some species over the back, rows of tubercles or spines. When they have completed their growth they shorten their length, the back becoming more convex; and fixing themselves by the tail to the bark, twig or a leaf, enter the pupæ or chrysalis state; from which in a short time the lady-bird is developed. These larvæ, from the time they issue from the egg until they have completed their growth, feed upon plant-lice or other tender insects, the former being their favorite and usual food. Some species prey chiefly upon the bark-lice. Nor do their carniverous propensities cease with the close of their larvæ state, but continue in the perfect state also. Half a dozen of these will clear a currant or rose-bush of lice in three or four days. I have seen a large rose bush badly infested with lice cleared of them in two days by four spotted lady-birds (*Hippodamia maculata*) which the owner placed on it at my suggestion.

The following species of this family may be mentioned as those most common in Illinois:

Hippodamia (*Megilla*) *maculata*, DeG. The Spotted Lady-bird.

Is oval in form, of a brick-red color, with two black spots on the thorax and ten on the wing-covers. The latter are arranged four on each side and two on the center or middle line where the two wing-cases meet.

Is a general feeder, destroying eggs of various insects, and eating plant-lice, chinch-bugs, etc. Very common throughout the State.

Hippodamia convergens, Guer. The Convergent Lady-bird.

A little smaller than the preceding, and broadly-oval in shape; orange or orange-red; thorax black, with two oblique white dashes; five black dots on each wing-case, placed 2, 2 and 1, the anterior two the smallest, all less in size than those on the *H. maculata*.

Hippotamia 13-punctata, Herbst. The 13-Spotted Lady-bird.

Rather smaller than *H. convergens*, but similar in form; of a brick-red color, with six black spots on each wing-case and one on the suture near the front.

Hippodamia glacialis, Fabr. Ice Lady-bird.

Similar in form and size to *H. maculata*; of a bright orange-red color; thorax black, with two oblique yellow dashes; each wing-case marked with a double black spot just behind the middle, and a single black spot near the tip. A northern species.

Coccinella 9-notata, Herbst. The 9-Spotted Lady-bird.

About the same length as *H. maculata*, but hemispherical in form, varying in color from orange to a brick-red; with four black spots on each wing-case and one on the suture near the front.

Coccinella munda, Say. The Trim Lady-bird.

Is somewhat smaller than the preceding species; hemispherical; of a clay-yellow or dull orange color, without spots or marks of any kind on the wing-cases.

Anatis 15-punctata, Oliv. The 15-Spotted Lady-bird.

This is our largest species, being nearly half an inch long; hemispherical in shape; the thorax is cream colored, with a large black spot in the middle and usually a black dot each side; the wing-cases chocolate color, with seven black dots on each and one on the suture near the front; but it varies considerably, and some of the dots are sometimes wanting.

Among the Hymenopterous insects which assist in destroying plant-lice, none, perhaps, are more effective than certain very minute Ichneumon flies, which have received the name *Aphidiides* from the fact that they are parasitic upon the *Aphides* or plant-lice.

These little insects, which seldom reach one-tenth part of an inch in length, are wasp-like in shape, furnished with four tiny wings with three cubital cells in the anterior ones; mostly black bodies, variously adorned with bright yellow bands and other marks; the second and third segments of the abdomen move freely upon each other. When one is about to deposit her eggs she approaches and touches a plant-louse with her long slender antennæ, and is enabled thereby to determine with certainty whether it has received an egg; if not, she at once punctures the body

with her slender ovipositor and deposits an egg therein, and passes on to another to repeat the operation. This egg produces a minute grub or larva, which ultimately destroys the life of its victim, and comes forth a fly, similar to its parent.

The description of a few species will be sufficient to convey to the reader an idea of these useful insects, which is all that is necessary for present purposes.

Aphidius Lactucaphis, Fitch. Lettuce-louse Aphidius.

Deep black, legs trimmed with brownish; antennæ 19-jointed, second joint smallest, globular, third joint longest with a slight constriction in the middle; wings slightly smoky, outer marginal vein and vein bordering the cell beyond the stigma black, outer veins brown, stigma white; abdomen long, obovate, flattened, rather narrower than the thorax, tip rounded. Length, 0 06 inch.

The names given indicate the species of *Aphis* upon which these insects are known to be parasitic; but it is not probable they are confined to a particular species.

Aphidius (*Praon*) *polygonaphis*, Fitch. The Knotweed-louse Aphidius.

Black and shining; abdomen slender and elliptical, of a bright sulphur-yellow color, tinged with dusky above and beneath the tip, with broad yellowish bands at the anterior sutures, base narrowed to a short pedicel, which, with the legs and base of the antennæ, are reddish-yellow; Antennæ, 17-jointed. Length, 0.08 inch.

Apcidius (*Praon*) *viburnaphis*, Fitch. Cranberry-louse Aphidius.

Black and shining, similar to the preceding, but the abdominal pedicel and the legs only, yellowish; antennæ, 15-jointed.

Aphidius (*Praon*) *avenaphis*, Fitch. Grain-louse Aphidius.

Black; legs, base of the abdomen and also a sub-basal band, yellow; abdomen as long as the thorax, but narrower, oval, first segment forming a pedicel; antennæ as long as the body, slender, 20-jointed, black; thorax egg-shaped, black and shining. Length, 0.10 inch. Parasitic on the oat or grain Aphis (*Aphis avenæ*).

Toxares triticaphis, Fitch. Wheat-louse Aphidius.

Black, shining; antennæ threadlike, longer than the body and 25-jointed; thorax egg-shaped and rather broader than the head; abdomen flattened, long, oval, a little longer than the thorax, but scarcely as broad. Wings transparent, slightly smoky, strongly iridescent; stigma pale brown; veins brownish black. Length, 0.08 inch. Parasitic on *Aphis avenæ*.

Trioxys salicaphis, Fitch. Willow-louse Aphidius.

Black and shining, with a long, elliptical abdomon of honey-yellow color at the base, but gradually passing to black posteriorly ; legs, yellow ; feet, dusky ; antennæ two-thirds as long as the body, 13-jointed. Length, 0.06 to 0.07 inch.

Trioxys populaphis, Fitch. Poplar-louse Aphidius.

Black and shining, the abdomen long, elliptical, and much narrower than the thorax, the basal sutures yellow ; legs yellow, except the posterior thighs, which are black ; antennæ nearly as long as the body, 15-jointed ; outer margin of the fore wings, blackish ; stigma, dusky. Length, 0.07 inch. Parasitic on an Aphis found on the leaves of the Balm of Gilead.

Trioxys cerasaphis, Fitch. The Cherry-louse Aphidius.

Black, with the palpi and legs pale yellowish-brown ; antennæ almost as long as the body, 18-jointed ; abdomen elliptical, rather narrower and shorter than the thorax, with scarcely any pedical at its base, shining and tinged with brownish ; wings, pellucid ; stigma, cloudy white. Length, 0.07 inch.

These, as a matter of course, form but a small portion of the large number of species of this group of parasitic insects. Whether any species are limited in their operations to a particular aphis has not been yet satisfactorily ascertained ; that some are parasitic on more than one species of aphis is true, but at the same time it may be true that certain plant-lice may have their special parasites.

Another group of plant-lice destroyers is found in the order *Neuroptera*, which consists of the Dragon-flies, Ant-lions, Lace-winged flies, etc. These are the Lace-winged flies which have rather long, slender bodies, and four broad, spreading, thin, membraneous wings, with numerous transverse veinlets. They are usually pale green, and when handled leave on the hands an unpleasant odor. The female suspends her little eggs on delicate threads, in clusters, on the under side of the leaves where the plant-lice abound. The larvæ which hatch from these are somewhat spindle shaped, narrowed in front, rounded behind, and broadest rather behind the middle, and furnished with large curved, sharp jaws, with which they seize and devour their helpless victims.

A description of two or three species known to inhabit Illinois will be sufficient to give the reader an idea of these important aids.

They belong chiefly to the genus *Chrysopa*.

Chrysopa oculata, Say. The Eye-marked Golden-eye.

Greenish-yellow ; antennæ yellowish, apex obscure, second joint annulated with black, first joint with a red dorsal spot at ring ; head yellow, bases of the antennæ surrounded with black rings, a black point each side behind the eye, and four black points on the occiput ; front thorax with

three black points each side; wings hyaline, transverse veins of the front pair more or less black. Length to the tip of the wings, six to seven-tenths of an inch; wings expanded measure rather more than one inch.

Chrysopa illepida, Fitch. The Disagreeable Golden-eye.

Similar to and probably a variety of the preceding; has the four black points on the occiput united into two lines, and a part only of the transverse veins of the front wings black.

Chrysopa chlorophana, Fitch. The Yellow-headed Golden-eye.

Similar to the preceding, and probably a variety also of *C. coculata*. Pale yellowish-green, with a light yellow head; the wings more rounded at the apex, with the veinlets mostly green. Expands 1.10 inch.

Chrysopa ploribunda, Fitch. The Weeping Golden-eye.

Very pale green, with a paler dorsal stripe along the body; head pale yellowish, with a small black line at the eyes; antennæ whitish, with the apex yellowish; legs greenish white, feet yellow. Sometimes there is a reddish or orange spot each side of the head. Expansion one inch.

Common in Illinois.

Chrysopa pseudographa, Fitch. The Counterfeit Golden-eye.

Much like the last, but of a straw color without any tint of green; head brighter yellow, with a small black line each side of the face; antennæ, feet and veins of the wings, whitish; abdomen with a narrow white dorsal line and an apical yellowish spot on each side of each segment. Expansion one inch.

Although these and several others are given by Dr. Hagen and Dr. Fitch as distinct species, it is more than probable they are but varieties of one or two species; at least they have similar habits, and hence their distinction is a matter of but little consequence to the horticulturist. They are his friends, and so far as possible should be protected; and whenever he observes the eggs mounted on their little transparent hairs he should be careful to leave them uninjured, as the larvæ will soon destroy the plant-lice among which they are placed. Nor do they confine their attacks to Aphides alone, but prey with equal avidity on a host of other injurious insects, even the unsavory chinch-bug is not free from their attacks.

They usually pass the winter in their cocoons, though some appear to live on until spring in the perfect state.

Other inveterate enemies of the plant-lice are certain two-winged flies which belong to the order *Diptera* and family *Syrphidæ*, of which the genus *Syrphus* is the type, or rather contains the typical species.

These somewhat resemble the common house-fly in size and shape, but are much handsomer, being usually of a bright yellow color, with

bands and spots of black; the abdomen is flattened, and usually marked with bands or partial bands of black. They are known in some sections as "corn-flies," as they are often seen in great abundance, about the time the corn is in bloom, hovering around the stalks, poised in the air apparently almost motionless. Sometimes they are called "sweat-flies," from the fact that on hot, sultry days they are most numerous. They drop their eggs, one in a place, upon the leaves and twigs which are infested with plant-lice, led by instinct to know that these will form appropriate food for their young, although they, as perfect insects, feed on the sweets of flowers and other similar food. The larvæ which hatch from these are maggots without any distinct head, not even possessed of eyes, but compelled to seek their food by blindly exploring the surface of the leaf on which they are placed. They are somewhat of an elongate wedge-shape, blunt and broadest behind, and tapering forward to the front. When one is feeding it elongates the front part of its body, and, feeling around until it finds an Aphis, fastens upon it by its mouth, raises it in the air, and proceeds to suck the fluids from its body until nothing but the shell remains.

These worms or maggots are usually of a transparent greenish or whitish color, sometimes more or less clouded or spotted with other colors.

Quite a number of species belonging to the genus are found in Illinois, but as these have not been identified, and I am not at present supplied with specimens, I am unable to give descriptions.

Certain minute mites, belonging probably to the genus *Trombidium*, have also been found preying upon plant-lice, and, as I suspect, also upon their eggs. Some birds also assist in diminishing their numbers.

This array of enemies, which might be greatly increased, will show that nature has been careful to provide means for keeping in check these prolific vegetable parasites, without whose aid plants would necessarily soon be destroyed.

ARTIFICIAL MEANS OF DESTRUCTION.

The external envelope of the plant-lice is so delicate, and their hold on life, so far as the individual is concerned, so easily broken, that they are usually quite easily destroyed by the application of any acrid substance to their bodies. As they live out their entire lives on a very limited portion of the plant they occupy, it follows that they must be attacked directly, and while on the plants they infest. It is true that there is usually one brood or generation that passes the winter in the egg state; but so far the closest scrutiny has been enabled to follow but few through this period, and the eggs are not only so minute as to render their discovery difficult, but they are more tenacious of life than the adult apterous individuals of the summer broods. It is apparent, therefore, that the most accessible point and vulnerable period is during the summer, while they are at work upon the plants; and the remedy must be one which will destroy the lice without injuring the life or value of the plant. As they are too minute to be picked off by hand, even from the most valuable plant, if at all numerous, and cling by their inserted beaks

too closely to the leaves and bark to be easily dislodged, our remedies are limited almost entirely to direct applications of such a character as will kill them without destroying the plant.

In some cases, as with the cabbage and some other garden vegetables, some small plants, such as flowering annuals, pot-plants, etc., which are attacked by species which limit their operations to the leaves, it is possible, by being watchful, to check them by removing, as soon as they appear, the leaf or leaves on which they commence operations. If this is done in time, and any stray winged specimen seen on the plant destroyed, the remedy may be effectual. This is one of the remedies practiced in England for the species which attacks the turnip crops. While it is often well to make use of this remedy, especially in cases of isolated, pot and some other plants, the objection to relying wholly upon it even in these cases is, that if but a few stray individuals are overlooked they soon spread their colonies over the foliage, and some more effectual means of destroying has to be adopted.

As a general rule, fruit, ornamental and other trees, are not very seriously injured by any species belonging to the section or group we have been considering; but the reader must be careful not to apply this statement to all plant-lice, as there are some yet to be mentioned which very seriously injure fruit trees and other woody plants. It is not often, therefore, that it becomes absolutely necessary to resort to artificial means of destroying any species of this group infesting trees, these plants being sufficiently hardy to withstand their attacks until their numerous enemies find them out and come to the horticulturist's relief. I might refer here to numerous instances where they swarmed to such an extent upon fruit trees that the horticulturist felt it absolutely necessary to take some active measures to save the lives of his trees, when suddenly they disappeared as if by magic before the attacks of a host of enemies which had discovered them.

The following are some of the remedies which have been suggested, each of which may, under certain circumstances, be used with advantage:

One of the most common remedies, and one easy to apply, is drenching the plants infected with strong or acrid solutions, such as strong soap-suds, weak lye, tobacco water, lime water, soap-suds and tobacco water mixed, to which sometimes sulphur is added, etc. The application to be made as complete and thorough as possible. Where the plants cannot be thoroughly drenched, which is usually the case, the solution may be applied with a watering pot or garden syringe, or on the limbs and twigs of trees with a whitewash or other similar brush, or even an old broom. Such application, it must be remembered, only destroys the lice it touches, and if but a few, here and there, are left, their powers of rapid reproduction will enable them soon to establish new colonies, and the work will have to be done over again; hence, wherever the plants can be absolutely drenched this is the best method. Where the terminal twigs and leaves only of bushes and low trees are affected, these may be bent down and dipped in a basin holding the solution. A solution of strong carbonate of ammonia — half an ounce to one quart of water — is recom-

mended, especially where the lice are on fruits or leaves which are to be eaten, as it is both clean and effectual. Another remedy, where the application is on an extensive scale, is dusting the plants with lime; this is recommended by Dr. Harris for infested potato fields; I would also suggest it for the Grain Plant-louse (*Aphis avenæ*), where found on winter wheat in the fall, or on winter or spring wheat in the spring before gathering about the heads. For the latter species Dr. Fitch recommends dusting the grain with dry powder of chloride of lime.

For the Carrot Plant-louse (*Aphis dauci*) Curtis recommends dusting powdered tobacco over the crowns early in the morning whilst the dew is upon them, or watering them with a decoction of tobacco.

The most effective remedy, where it can be applied, is tobacco smoke or the fumes of burning tobacco, sulphur, etc. But to render these successful the plant must be covered in some way, so as to confine the smoke or fumes and cause them to penetrate to all parts. A frame, in the shape of a box or bell, covered with cheap cloth of any kind, will answer very well for the flower or vegetable garden, and might be used also for small bushes.

Various means of using this remedy will suggest themselves in connection with the means at hand and the plants to which it is to be applied; the object to be attained being to confine the smoke of the fumes immediately around the lice long enongh to suffocate them. Sometimes a minute or two will suffice, where the application is strong and direct; but usually ten or fifteen minutes, or even longer, will be necessary, where closely confined; but the more diffused the longer time will be required.

It is possible that an apparatus might be invented for the direct application of tobacco smoke or sulphur fumes, something on the plan of sand-bellows with which painters dust sand over wood work, or similar to the Babcock extinguisher. If it is possible to bring into use, at a reasonable expense, something of this kind sufficiently large to reach, through hose or pipes, the limbs of trees, it would be exceedingly useful, not only against Aphides but numerous other insects.

Sub-Family Myzoxylinæ.

I have adopted this name from Serville and Amyot provisionally, to be cast aside when a proper arrangement is given. In the first place, the generic name from which it is derived has become nearly or quite obsolete; and in the second place, this division of the family contains species so widely different in characters and habits that they should be placed in separate groups; but as I am unable at present, as heretofore stated, to give a correct arrangement, this is given simply as an aid in determining species. If the reader can obtain a correct idea of the distinguishing character of a group, so as to be able to determine whether a given species belongs to it or not, it then becomes much easier for him to determine it.

As heretofore stated, this group or division of the family is distinguished from the preceding chiefly by the fact that its species are without honey-tubes or tubercles representing them; and by the veining of the fore wings, the third discoidal vein never being twice forked.

Usually they are minute in size, and more or less covered with a cottony substance, secreted from the pores of the body. They generally reside on the trunks, stems, twigs or roots of plants, or, if on the leaves, in galls which they produce. Their habits are quite varied, some residing all their lives in colonies on the trunks or larger branches of trees; others on the twigs or tender shoots of the plants they infest; others on the roots, coming to the surface only in the winged state, while a few, so far as known, never acquire these organs, and hence are supposed to be wholly subterranean; some pass their entire existence in galls, which they form on leaves or leaf-stems, etc.

Some carry their wings erect in repose, as those heretofore described, while many rest them horizontally on the abdomen. The veining of the wings also differs considerably, the fore wings in some being similar to the typical form already described, as Fig. I., except that the third discoidal or branch vein has but one fork, instead of two; this form may be seen at Fig. V.; others have this vein simple, that is, without any fork or branchlet, as Fig. VI.; while in others the first and second discoidal veins appear to be united and the third wanting, as Fig. VIII., etc.

Although the double method of reproduction, heretofore described, prevails throughout this division or sub-family, yet the agamic females of some genera always produce eggs instead of larvæ, while others bring forth the larvæ inclosed in a thin, delicate, membraneous, egg-like sac, which they rupture soon after extrusion, and which may often be seen attached to the tip of the abdomen like a cottony filament.

The division contains a number of genera, distinguished from each other chiefly by the veining of the wings; the position of these organs in repose; the comparative length of the antennæ and the number of joints they contain; and by their habits. But few of the species found in this country have been carefully studied, yet among these are some of the most destructive species belonging to the family, as the notorious Grape Phylloxera, the Woolly Aphis of the apple tree, etc.

The species of this country, so far as determined, belong chiefly to the following genera: *Eriosoma*, *Pemphigus* and *Phylloxera*. A few belonging to the following genera have also been observed: *Adelges*, *Thalaxes*, *Chermes*, *Hormaphis* and *Rhizobius*.

These genera may be arranged in the following groups, not perhaps with that strict accuracy required by science, but with an approximation sufficient for practical purposes:

Wings erect in repose—*Eriosoma*, *Pemphigus* and *Adelges*. Wings horizontal in repose—*Thalaxes*, *Chermes*, *Hormaphis* and *Phylloxera*. Never acquiring wings, so far as known, and living wholly under ground—*Rhizobius*.

As the winged specimens are seldom seen, as compared with the apterous individuals observed, we may add that, as a general rule, so far as the species of this country have been observed, these genera may be arranged by their habits as follows:

Residing on the branches, trunks, or roots, and not forming true galls—*Eriosoma*, *Chermes* and *Rhizobius*.

Residing chiefly on the leaf or leaf-stalk, and forming true galls, in which they are hid from view—*Pemphigus*, *Thalaxes*, *Hormaphis* and *Phylloxera*. One species of the last named genus lives partly on the leaves, where it forms true galls, and partly on the roots, where it does not form true galls.

I am unacquainted with the species of *Adelges*, but believe they produce swellings on the twigs, chiefly of pine trees.

Genus Eriosoma (Schizoneura).

The species of this genus do not usually, if ever, produce true galls, that is, galls in which they reside, but are almost invariably found on the bark of the trunk, branches or roots, where they produce a roughened condition, little pimples, or even knotty excrescences or swellings. Their wings are erect in repose, in the form of a steep roof above the abdomen; the rib-vein of the fore wings emits three oblique branches similar to those of the typical species already described, but the third or outer branch is only once forked, and is often obsolete or indistinct at its base (see V., fig. 3); the hind wings have the rib-vein near the front margin, which gives off on the posterior side but one branch. The abdomen is without any honey-tubes, and from the pores of the body there is usually secreted a white, cottony or downy substance, with which the young and apterous individuals are more or less covered. The summer broods consist, as the previous species, chiefly of females, which otherwise produce living young without the intervention of the male.

68. { *Eriosoma lanigera*, Hausm. The Woolly Aphis of the Apple-tree, "American Blight," etc.
Pemphigus pyri, Fitch. The Apple-root Plant-louse.

I do not give these two names as synonyms of the same species, but mention them together because, by some, they are considered as varieties of one species, while by others they are treated as distinct. As I propose to discuss this point more fully at another time, I will here mention only the more prominent facts relating to their history, habits, nomenclature and characteristics, leaving the reader to form his own conclusions. For convenience, but without intending thereby to imply a specific distinction, I will use the name "Woolly Aphis," to designate the *E. lanigera*, or trunk and branch inhabiting type; and "Apple-root louse," or simply "Root-louse," to designate the *P. pyri*, or root-inhabiting type.

The *E. lanigera*, or Woolly Aphis, was first described and scientifically named by Hausmann, in 1801, as infesting the apple trees of Germany. According to Serville and Amyot, it was unknown in Europe until 1787, at which time it was first seen in England, having been imported that year from North America. Tougard (Ann. Soc. d'Hort. de Paris) asserts that it was unknown in Belgium previous to 1829. The same authors also assert that it was unknown in France previous to 1812. Harris, relying upon the authority of Salisbury, ("Hints on Orchards,") asserts that it was known to French gardeners for a long time previous to the earliest of these dates.

If it was imported from England to America in 1787, it did not pass into France until 1812, and did not reach Belgium until 1829, although possible, yet it is somewhat strange that Hausmann should describe it as infesting apple trees in Germany in 1801, and that without any hint of its recent importation. A careful examination of what is said by Serville and Amyot in reference to this point indicates that they overlooked Hausmann's statement, yet they used his specific name and had before them volume I. of *Illiger's Magazine*, in which the description is found and statement made. These facts, when connected with Salisbury's statement, give us reason to doubt the correctness of the assertion that it was imported into England from America. I may also further add, that M. Eudes Deslongchamps, in a prize essay to the Royal Agl. Soc. of Caen, in 1830, and M. Blot, in a work of the same date, maintained that it was not introduced from North America, but that it was indigenous to Europe, that occasionally, under favorable circumstances, it was greatly multiplied in certain localities, and then for a time would disappear, and hence the idea of its importation. The name, "American Blight," given to it in England, indicates, on the other hand, the popular belief in that country of its American origin.

Prof. Riley, in his third report (1871), asserts, upon what authority I am unable to say, that it is conceded on almost all sides that it was imported into Europe from America, and that there is every reason now to believe the two species here mentioned are identical, or at least but varieties of one species. Without attempting now to decide this point, as I have no European specimens, and am without copies of some of the latest works on the subject, I will give brief descriptions of the former species—the Woolly Aphis (*E. lanigera*)—as found in Europe, and what is supposed to be the same species as found in this country.

The most recent description I have at hand at this moment is by Goureau (1862), who gives the characters briefly as follows :

Apterous individuals.—About one-tenth of an inch long ; reddish-brown and covered above with a white, cottony secretion ; antennæ, short and pale yellow ; legs, yellowish ; knees, brown ; without honey tubes, but with a circular cicatrix in place of each. *Winged individuals* — Antennæ shorter than the head and thorax, and varying in color from brown to black ; head and thorax black, a brownish ring at the collar ; the abdomen, chocolate-brown ; legs, brownish ; wings, hyaline, with the veins and stigma deep brown ; body enveloped in a white, cottony secretion. Serville and Amyot give the length of the apterous individuals as only eight-hundredths of an inch ; they describe the winged individuals as less, and with the body almost naked.

Hausmann and Knapp and Harris, following them, were of the opinion the species never acquired wings ; but so far as the European type is concerned, this is evidently a mistake ; and Mr. Verrill, in an article in *The Practical Entomologist*, informs us that he has observed quite a number of winged individuals of this species—both males and females—upon apple trees in New England. These he describes as having well-formed and rather large wings, but in other respects closely resembling

the apterous specimens, except that they had but little of the downy substance on their bodies, which were nearly black and rather plump. The fore wings were large, and had three discal (branch) veins, the third one forked near the middle, and scarcely visible near its base before forking. The stigma, or colored spot, was about three times as long as broad, and acute at each end. The hind wings were about half as long as the others, and quite narrow, with two simple discal veins.

Let us now turn to the other species, the Apple-root louse (*Pemphigus pyri*), and examine briefly its history and habits, and what relation it has to the other species that has induced me to speak of the two together.

This species was originally described by Dr. Fitch, in 1851, as *Eriosoma pyri*, but afterwards (1855) transferred by him to *Pemphigus*, because the third vein of the fore wings of his specimens were simple, and not forked. Mr. Walsh, in volume I. of the Proceedings of the Entomological Society of Philadelphia, and in *The Practical Entomologist* (1866), declared the two species to be distinct. In the latter, he states, in answer to a correspondent from Pennsylvania: "You think that the *Aphis* that causes warts or knots on the roots of young apple trees in the nursery is the same insect as the *Woolly Aphis* that lives on the twigs. You are, undoubtedly, mistaken, for they do not even belong to the same genus, much less to the same species. The Woolly Aphis is *Eriosoma lanigera*, the Apple-root Aphis is *Pemphigus pyri*."

In his first report as Acting State Entomologist (1868) he repeats this declaration emphatically, and proceeds not only to give the differences between the characters of the two species, but also of their habits, contending, after Blot, that the former is exclusively northern, while the latter extends more southward. He also states in reference to the Woolly Aphis: "It is now, however, pretty clearly ascertained to have existed on the continent of Europe from time immemorial, and it probably emigrated thence into England on imported apple trees." It is proper to add, that up to this time Mr. Walsh had not succeeded in obtaining any winged individuals of the Apple-root Aphis, but had relied implicitly on Dr. Fitch's description. In an article on this species by the editors of *The American Entomologist* (January, 1869) the winged individual is described and figured from a number of specimens, but differing essentially from Dr. Fitch's description. Not only is it much less, but does not even belong to the same genus, being a true species of *Eriosoma*, with the third vein of the fore wings forked. The authors, upon marking this discovery, came to the very reasonable conclusion that Dr. Fitch was mistaken in believing his specimens belonged to the Apple-root louse; that they must have been stray specimens which had in some way become intermixed with his specimens of the latter species. They also argue from the habitats of the two species (the Root-louse and Woolly Aphis), and from the fact that this works on the roots, while the *E. lanigera* works on the trunks and branches, that the American species is not identical with the European, and that the latter is unknown in the United States. This article was, in great part, transferred by Prof. Riley to his first annual report (1869), without any dissent to the views there expressed: but in his third report

(1871), as heretofore stated, we find him expressing the opinion that the two species are identical, or, at least, but varieties of one species, and that the former (*E. lanigera*) was imported into Europe from this country, which opinion, I believe, he still entertains.

One or two more facts and suggestions, and for the present I will leave the matter with the reader, that he may form his own conclusion.

I have repeatedly seen, in the southern part of this State, winged individuals among the colonies of Woolly Plant-lice on the trunks of apple trees; these I always regarded as belonging to these colonies. They correspond with the description given by the editors of *The Entomologist*, in regard to color, size and wings, but were found upon the trunks and limbs of the trees and around the collar at the surface of the ground, and may, for aught I know, have been also on the roots, as I did not extend my examination to these. But it is certain they are quite common on the trunks and branches, in the little fissures, breaks and abraded spots in the bark. Goureau also states that the European species is found on the branches, trunks and roots of the trees. Verrill's description of the specimens he found in New England agrees exactly with that of the Apple-root lice found by the editors of *The Entomologist*. It appears, therefore, to be pretty well settled that Dr. Fitch was mistaken in reference to where his winged specimens belonged, or that his species differ from the Apple-root louse in the west. It has also been pretty clearly demonstrated that the Woolly Aphis of the trunk and branches is the same as that found on the roots. On the other hand, the preponderance of evidence appears to be against the idea of importation from America to Europe.

Dr. Fitch's species may be briefly described as follows: The young larvæ are scarcely 0.04 of an inch long; of an oval form, and a pale, dull yellow color. Legs short, robust, and nearly equal in length. The antennæ appear much like a fourth pair of legs, and apparently five-jointed. From the tip of the abdomen is usually seen protruding a white filament of flocculent, cotton-like matter. It is proper to state that in some respects this description differs slightly from the appearance of the larvæ I have examined from the trunk.

Winged individuals.—These are nearly a quarter of an inch long to the tips of the closed wings; body, legs and antennæ, coal black; the head and abdomen covered, on the back with cottony down. Front wings, transparent and slightly smoky, as though sprinkled with fine dust; veins, black; the third vein is rather more slender than the first, nearly straight, not forked, its basal third abortive; stigma dark, smoky brown, oblong; its opposite sides nearly parallel, abruptly converging to an acute point at each end. Hind wings, clearer; the two discoidal veins, black.

The winged individuals found in Illinois may be briefly described thus: General color, black; antennæ not quite half as long as the body, third joint half as long as the entire antennæ; abdomen, more or less sprinkled with white downy matter. Wings, transparent; third discoidal vein forked near the middle, its basal portion obsolete; stigma nearly three times as long as it is wide, pointed at each end, and pale brown. Length, to the tips of the closed wings, about one-seventh of an inch.

As it is certain that our Illinois insect infests both root and trunk, we may assume, so far as practical purposes are concerned, that the two supposed species (rejecting Fitch's winged specimens) are identical, and treat them as such.

These minute pests, having reached the roots in a way not yet fully and satisfactorily explained, by their numerous punctures and the extraction of the sap cause irregular distortions, swellings and knots to be formed thereon. The effect of this, when the roots are badly infested, especially of young trees and nursery stock, is to cause them to become sickly and finally die. Where they are sufficiently numerous to cover and deform the root of a tree, that root almost invariably rots, then the lice leave it. As a matter of course, the effect produced by these insects on a young tree is much sooner perceived than on those that are older and larger. Prof. Riley found, from some observations made by him on an orchard at St. Louis, that young nursery trees whose roots were badly infested died the following season, the roots always rotting previous to the death of the tree. He appears also to think this rot can be distinguished from that produced by any other cause, by its being more porous and soft and approximating the brown mould of a rotting log. Although there is a tendency in the deformities to disappear when the exciting cause is removed, yet where the lice only leave because it is dying it appears scarcely possible that the deformities should entirely disappear, as the only means of removing them is gone when vitality is wanting; and these, if remaining, would indicate at once the cause of the rot. Most orchardists are aware that the work of these insects can generally be detected where they have been working about the collar of the trunk, even after they have disappeared; there is a peculiarity in the appearance of the bark which is readily detected by the experienced eye. In such places they usually cause a mass of minute granulations, giving the bark a roughened or shagreened appearance, and looking as though the thin, delicate outer layer of bark or epidermis had been removed. If present, they may easily be recognized by the peculiar bluish-white, cottony matter they secrete from their bodies, which is never met with in the case of the common Apple-tree Plant-louse (*Aphis mali*). The same thing is also true in reference to the spots on the trunk and branches which they attack. When they locate on these portions of the tree, they usually, and so far as my observations go, always select as a starting point, some fissure, cut, break or otherwise injured portion of the bark; or, if these cannot be found, the wrinkles about the axils or forks of the larger limbs and elsewhere. I noticed some the past summer, in little scattered colonies, on the smaller limbs and even twigs of an apple tree standing in my yard. If a tree is neglected and allowed to send up sprouts from the base of the trunk, the point where these join the trunk at or below the surface will be found a favorite resort for these insects.

Do they pass from the trunk and branches to the roots? Or, in other words, what relation do the two races bear to each other?

Dr. Fitch thinks the parent insect insinuates herself downward, along the side of the root, at the close of autumn, and there deposits her

eggs and perishes; that these eggs hatch in the spring as soon as the ground becomes sufficiently warm, and the colony is continued through the season by the viviparous propagation usual with the Aphides; that in the autumn following winged individuals again appear, and, leaving the ground, seek new homes.

So far as the method of propagation is concerned, it has been shown by Dr. W. M. Smith, of New York, that it differs slightly from the true Aphides, in that the young larvæ produced by the agamic females are inclosed in the thin egg-shaped covering heretofore mentioned, from which they have to free themselves in a manner analogous to hatching. The remains of this covering may often be seen attached to the tip of the abdomen, and is doubtless the supposed cottony secretion alluded to by Dr. Fitch in his description of the young larvæ. The fact of acquiring wings is in itself an evidence that these individuals, at least, are intended by nature to come to the open air with the power to roam and seek new localities. It is supposed by some that those on the trunk and branches remove to the roots as winter approaches. I have strong doubts on this point, unless by "removing" is meant that the mature winged females, which appear among these colonies at the approach of winter, after pairing, deposit their eggs on the roots. Mr. Verrill states, in *The Practical Entomologist*, that he found healthy and active lice of all sizes, and busily engaged in sucking sap, on the under side of the branches as late as December 11, after two snow storms and many cold rains and freezing nights. I have now (January 5, 1877,) before me on the microscopic slide a larva of this species, just taken from the trunk of an apple tree, which is alive and struggling to escape; yet, as all are aware, we have just experienced one of the coldest spells of weather ever known in this section. It is proper to add, that although a part of the little colony from which this was taken was living, the larger portion appeared to be dead.

I think it is therefore evident the species may, and perhaps often does, pass the entire round of the seasons, and undergo all its changes, on the trunk or branches, without any transfer to the roots. Yet the root may be, and probably is, its normal habitat, and the early winged females, led by the mildness of the season to deposit her eggs on the trunk, the colony struggles on against the cold of winter with a remarkable vitality, which the species has acquired from their naturally cold habitat. So far as I am aware, no difference has been discovered between those dwelling on the trunk and those on the roots, though this point has not been thoroughly studied.

Natural Enemies.—It is probable that the insects which attack the ordinary plant-lice will also attack with equal avidity the Woolly Aphis, especially those individuals found exposed on the trunk and branches; but as special enemies we may mention the following: A minute Chalcis fly (*Eriophilus mali*, Hald.) has been described by Haldeman as parasitic on the Woolly Aphis. A second insect enemy is the Root-louse, Syrphus fly, (*Pipiza radicum*, W. and R.,) first detected by Messrs. Walsh and Riley as feeding on the larvæ. The larvæ of this fly is a footless maggot, about half an inch long, and of a dirty yellow or pale flesh color; spindle-

shaped, attenuated in front and somewhat more abruptly lessened behind; the body is marked with transverse ridges. When not extended, its length is only about one-fourth of an inch. A third enemy is a minute lady-bird, only about one-twentieth of an inch long, and of a deep brown color on the wing-cases, the thorax being of a lighter color; its scientific name is *Scymrues cervicalis*, Muls. So far as observed, this species has only attacked those lice found on the trunks and branches or at the surface of the ground. I have also noticed a mite very often in the vicinity of the colonies under circumstances which led me to believe they preyed upon these insects, but have not attempted as yet to determine the species.

Remedies.—When a tree ceases to grow with its usual vigor, its leaves becoming paler and more of a yellow hue than customary, and there is no apparent cause for this decline, it will then be well to examine the roots, to see whether or not they are infested by this louse. If found, some one of the following methods of destroying them may be adopted:

First, Dr. Fitch's, which is to clear away the earth from the roots as far as it can conveniently be done, and pour strong soap-suds upon them in sufficient quantity to penetrate and saturate the crevices in the excrescences. The soil taken out should be removed and other soil substituted, or, if returned to its place, ashes should be freely mingled with it. In the nursery, when transplanting or lifting the young trees, if a careful examination, which should always be made, shows any signs of the lice on the roots, they should be dipped in strong soap-suds, which will generally effectually destroy them.

Another method, which was long ago practiced by French horticulturists, and strongly recommended by Blot in his celebrated essay on this species, and which has also been recommended in this country by Harris, Walsh and Riley, is to drench the roots of the infested trees with hot water; applying a sufficient quantity to penetrate to all parts of the roots which are attacked. Riley remarks that mulching around the infested trees has been found, by Mr. A. E. Riehl and others, of Alton, to have the effect of bringing the root-lice to the surface of the ground, thus rendering them more easily reached by the water. That mulching or surrounding the collar with rubbish has a tendency to collect these insects at this point is certainly true, at least such appears to be the case so far as my observations have extended, but whether these are from the trunk or roots is a point I have not determined. It was on this account that I recommended mixing ashes or lime with the mulching immediately around the tree.

As to the lice on the trunk and branches, Harris mentions the following methods of destroying them:

Melted resin, mixed with an equal quantity of fish oil, put on the infested spots, while warm, with a painter's brush. Removing the old and rugged bark and scrubbing the trunk and branches with a stiff brush. Applications of the spirits of tar, turpentine, urine, kerosene, soft soap, and other similar substances, have been recommended.

The same author suggests the following method, which requires too much time and trouble, except now and then in case of a very valuable

tree: "Scrape off all the rough bark of the infested trees, and make them perfectly clean and smooth early in the spring; then rub the trunk and limbs with a stiff brush wet with a solution of potash; after which remove the sods and earth around the bottom of the trunks, and with the scraper, brush and alkaline liquor cleanse that part as far as the roots can be conveniently uncovered. The earth and sod should immediately be carried away, fresh loam should be placed around the roots and all cracks and wounds should be filled with grafting cement or clay mortar. Small limbs and infested branches, beyond the reach of the applications, should be cut off and burned."

It is not very difficult to reach and destroy the lice upon the trunk and larger branches, as this can usually be accomplished by an application of strong lye, soap-suds, etc., put on with a whitewash brush; or what would perhaps be more effectual, kerosene mixed with some other kind of oil. The great difficulty is to reach the insects on the roots, and the failure of all such applications as those above mentioned to counteract the Grape Phylloxera would indicate, at least, a somewhat similar result in reference to the Apple-root louse, notwithstanding the confidence with which they have been recommended. The hot water remedy is probably the best yet suggested, as it is the simplest, and as effective as either of the others.

Blot was of the opinion that topical applications were of but comparatively little use, his reliance being placed chiefly on preventive measures, and to this end he recommended the following culture: Avoid giving to the nursery in which the young trees are any more shade than absolutely necessary; avoid placing the trees in too flat or humid ground; give to both the nursery and orchard all ventilation possible, so that they may be thoroughly aired, and keep the heads of the trees open, so as to favor the circulation of air and the drying of the soil; use the plow frequently, and do not permit rubbish or twigs to remain under the trees; surround each tree with a mixture of soot or tobacco and fine sand.

As a matter of course, the preventive measures by cultivation must depend in part upon the character of the soil. If a very sandy soil, the necessity for air and sunshine is not so great as where it is heavy, nor is there the same necessity for repeated plowings. I am of the opinion that in most of the heavy soils of our State lime might be advantageously used in moderate quantities about the roots of the trees. And in the nursery lime or ashes might aid in keeping off these insects. These applications, combined with clean culture, will undoubtedly aid very greatly in preventing the occurrence of this pest, and also others almost or quite as troublesome.

69. *Eriosoma Rilepi*, (*E. ulmi*, Riley). The Woolly Aphis of the Elm tree.

This species was originally described and named by Prof. Riley, in his first annual report, as *Eriosoma ulmi*, but as this specific name is preoccupied by the *Aphis ulmi* of Linnæus, which was afterwards transferred

to *Eriosoma* by Sir Oswald Mosley, and as the two appear to be distinct, it is necessary to give this another specific name; I have therefore named it after the original describer. It is always preferable, where it is possible to do so, to give these insects specific names, which indicate the plant on which they feed, but in this case all the changes possible on the scientific name of the elm have been rung; two species, in fact, previous to this, having received the name *Aphis ulmi*, the second by Ratzburg, which has since been transferred to *Tetraneura*.

This species, which is quite common in this State, occasionally does considerable injury to the white elms which are planted for shade or ornament. They usually congregate in clusters on the limbs and trunk, causing an unnatural and knotty growth of the wood, somewhat similar to the knots produced on the roots of the apple tree by the preceding species. Their habits, so far as observed, appear to be very similar to those individuals of *E. lanigera* which inhabit the trunk of the apple tree.

The description given by Riley is as follows, which I give exactly as he has given it, in order to afford the reader an opportunity of comparing it with the description of the *E. ulmi* of Europe:

Color, dark blue; length to the tip of the closed wings, exclusive of the antennæ, 0.12 inch; wings, hyaline, three times as long as wide, and more pointed at the end than *E. pyri* (*E. lanigera*). Costal and subcostal veins, and that bounding the stigma behind, robust and black. Discoidal veins, together with the third forked and stigmal veins, all slender and black, the forked vein being as distinct to its base as are the others, with the fork about one-third as long as the vein itself and curved in an opposite direction to the stigmal vein. Antennæ, six-jointed, and of the same color as the body; joints 1, 2, 4 and 6 of about equal length, joint 3 thrice as long as either. Legs of the same color as the body. The young lice are narrower and usually lighter colored than the mature individuals, varying from flesh or pink to various shades of blue and purple. The cottony or woolly secretion by these lice is very abundant, usually covering them from view, and is very white. They generally appear in May or early part of June, and by the latter part of June or first of July the winged individuals are seen. Riley says that for these he has found by experiment that a washing with a weak solution of cresylic soap will kill them all instantly. He also adds that they are preyed upon unmercifully by a species of lace-wing fly, which he names *Chrysopa eriosoma*.

The characters of the *Aphis ulmi*, Linn., *Eriosoma ulmi*, Sir Os. Mosley, are given as follows by Walker: Dull black; antennæ stout, black, moniliform, slightly setaceous, shorter than the body; abdomen very short, slightly covered with gray filaments; legs moderately long; wings colorless, very much longer than the body; wing-ribs, black; stigma and veins, brown; stigma linear, rather long, acutely angular at each end; distance between the first and second veins at the tips full eight times that between them at the base; third vein nearer to the second towards the base than at the tip, much nearer to the second at the tip than the second is to the first.

70. *Eriosoma querci*, Fitch. The "Oak Blight," or Woolly Aphis of the Oak.

This species is found in the northern part of this State, upon oak limbs. Fitch says it is very similar to another species found on the basswood. The winged individuals are black throughout, slightly dusted over with an ash-gray powder. The fore wings are clear and transparent; the stigma is dusky, the rib-veins black, and the third discoidal vein with the basal portion abortive nearly or quite to the fork. The length to the tip of the wings is (0.16) a little over one-eighth of an inch.

71. *Eriosoma tessellata*, Fitch. The Alder Blight.

This species is found on the under side of the branches of the alder (*Alnus rubra*), crowded together and concealed beneath a covering of snow-white down. Wingless individuals, dull bluish black; the back of the segments are marked with strongly impressed lines, and covered with white down in square, checker-like spots. Length to the tip of the abdomen, 0.16 inch.

72. *Eriosoma imbricator*, Fitch. The Beech-tree Blight.

This species occurs on the under side of the branches of the beech, covered with a coating of white down; and, according to Dr. Fitch, from whose report the description of this, the preceding and following species is copied, when the branch on which they are situated is jarred a shower of tiny drops of a water-like fluid falls from these insects. It is possible it is identical with the European Beech Blight (*E. fagi*, Linn.)

Black; three last segments of the abdomen, blue-primrose; longitudinal vein, and a line on the middle of the inner margin, black. Winged females have the abdomen yellowish, with a black spot on the disk; legs, pale. Larva, pale, with two fuscous dorsal stripes; posterior half of the abdomen covered with a tuft of cottony down, from which proceed two longer and coarser filaments. Length to tip of wings, 0.22 inch.

73. *Eriosoma strobi*, Fitch. The Pine-tree Blight.

Common on the branches of the white pine, giving to the bark of infested trees a peculiar black appearance. Black, pubescent, somewhat powdered; a dorsal row of meal-like spots; fore wings with the costal margin, the apical, and two inner basal veins, black. Length, 0.20 inch. Belongs, according to Fitch, to a distinct genus intermediate between Eriosoma and Lachnus.

Genus PEMPHIGUS.

The species belonging to this genus are distinguished by the absence of honey-tubes from the abdomen; by the third discoidal or branch vein of the fore wings being simple without fork or veinlet, and often more or

less obsolete, especially toward the base; the mid vein of the hind wings, instead of sending off two discoidal branches obliquely toward the hind border, as in nearly all of the preceding species, usually divides about the middle of the wing into three nearly equal diverging branches; but Mr. Walsh represents it (see No. VI., Fig. 3,) as sending off two oblique branches on the posterior side. It is possible that there is some variation in this respect in the different species. They produce various kinds of galls on the leaves, leaf-petioles, buds and twigs of plants in which they pass their entire existence until the winged individuals come forth to seek new homes for future colonies. The agamic females, so far as observed, appear to be viviparous. The species are doubtless quite numerous, although, as yet, comparatively few have been studied and described. As these insects have no jaws with which to escape from the galls which they form, when the winged individuals wish to wander away to form new calonies, nature has wisely arranged it that the galls, in forming, always leave an opening on one side where the parts meet, but do not combine. In the galls formed by Hymenopterous insects which possess biting jaws, this is not needed, and hence no such opening is provided.

74. *Pemphigus vagabundus*, Walsh. The Vagabond Gall Plant-louse.

Fig. 5.

This species produces a rather large, irregular gall on the tips of the twigs of certain cotton-woods, and also occasionally on balsam poplars, which somewhat resemble the flower-head of the double cockscomb of our gardens. These galls turn black in the winter, giving the tree a singular and rather unsightly appearance after the leaves have fallen off. The winged insect generally makes its appearance in September; the body is black, and about one-tenth of an inch long; the expanded wings measure rather more than one-third of an inch from tip to tip; antennæ, six-jointed. The name *vagabundus*, or vagabond, has been given to it on account of its habit of wandering to a great distance from its place of birth. It is possible, as has been suggested, that Dr. Fitch's winged specimens, described as *P. pyri*, belonged to this species. A gall now before me, just plucked from a tree where it has been hanging for two seasons, contains not even a remnant of the lice, but in some of the convolutions I find the larvæ of a species of *Psocus*, a genus of minute *Neuropterous* insects.

75. *Pemphigus rhois*, Fitch. The Sumac Gall Plant-louse.

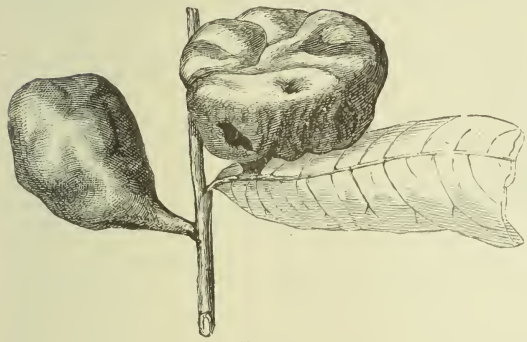

Fig. 6.

This species forms tomato-shaped galls on the leaves of different kinds of sumac, which usually arise from the mid-vein at or near the base. The shell of these galls is very thin, and the winged lice are found inside, in large numbers, in September. The winged individuals have the veins of the wings arranged as in the preceding, but they are much smaller, and the antennæ are only four-jointed.

76. *Pemphigus ulmi-fusus*, Walsh. The Red Elm Gall-louse.

This is a very minute species, which forms a solitary spindle-shaped gall, about an inch long, upon the upper surface of the leaves of the red elm. The winged individuals measure only about one-fourteenth (0.07) of an inch to the tips of the wings, and are of a uniform dusky color. An occasional specimen has the third vein partially or fully forked, as in *Eriosoma*, thereby indicating a close relationship to that genus.

77. *Pemphigus populicaulis*, Fitch. The Poplar-leaf Gall-louse.

This species forms the swellings or galls about the size of a bullet, so often seen on the leaves of the cottonwood (*Populus monilifera*) at the point where the blade joins the stalk or petiole. These galls often assume a reddish tint, and sometimes grow to the size of a small marble; having a mouth-like orifice on the under side and a cavity within where the lice reside. As Dr. LeBaron has given an account of this species in his Third Report, it is unnecessary for me to notice it further than to give a description of the species which is omitted in his report.

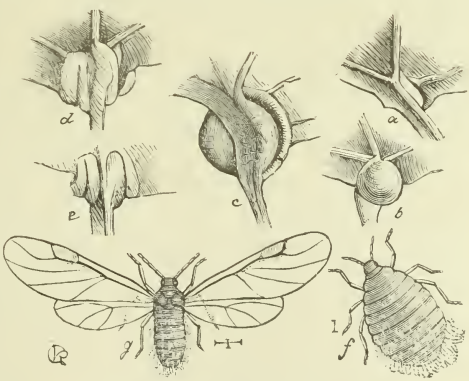

Fig. 7. Pemphigus Populicaulis.

a, Incipient gall on the under side of the leaf; *b*, Corresponding bulge on the upper side; *c*, Fully formed gall; *d*, Young galls; *f*, Wingless female; *g*, Winged insect.

The galls usually begin to appear early in May, and at first are occupied by a single wingless female, which in midsummer becomes the mother of a numerous progeny, often amounting to one hundred and fifty in number. Dr. LeBaron is of the opinion, from some observations he made, that they pass the winter in the egg state, and that the eggs are placed at the base of the buds.

The young lice are of a pale greenish or whitish color, variable in size, but usually about three-hundredths of an inch long. The winged individuals make their appearance about the middle of June. These are of a blue-black color throughout, sometimes with the base of the abdomen and legs pale brown. While in the gall the wings appear to rest horizontally on the back, but when they leave this they are held erect in repose, as is usual with the species of this genus; they are whitish and not perfectly clear, being more or less dusted over, as is the body, with a white powder; the marginal vein is robust and blue-black from the base to the stigma, but slender beyond that point; the rib-vein is also robust and of the same color till it reaches the stigma, where it is widened to twice its previous thickness, forming a broad blue-black margin along the inner side of the stigma; the stigma is dull white; discoidal veins, pale yellow; the first of these veins is straight, the second arises almost in contact with it, and is straight nearly to its tip, where it curves slightly toward the inner margin; the third vein obsolete for about one-fourth of its length at the base. Length to the tip of the abdomen about one-tenth of an inch; to the tips of the wings, one-seventh of an inch.

78. *Pemphigus popularia*, Fitch. Poplar Gall-louse.

A species noticed, by Dr. Fitch, wandering up and down the trunk of the balsam poplar, whose habits are yet unknown. It closely resembles the preceding, but its abdomen is green; its antennæ quite short, reaching but two-thirds the distance to the insertion of the wings; the rib-vein not widened along the stigma; length to the tip of the wings about one-eighth of an inch. Color black, slightly dusted over with a whitish powder; the abdomen dull green, with a coating of white flocculent down; sides parallel; wings dull hyaline; the rib-vein black.

79. *Pemphigus populi-globuli*, Fitch. The Poplar-bullet Gall-louse.

This species produces a green gall about the size of a bullet, globular in shape, on the leaves of the balsam poplar. These galls are situated slightly above the base of the leaf, projecting from the upper surface, with a curved orifice or mouth on the under side; within these reside the lice, some of which are pale green, others very small and dusky, and larger winged ones of a black color. These are found in this condition in July. The winged individuals differ from *P. popularia* as follows: They are uniformly smaller, wings clearer and veins more slender and colorless, except the marginal vein, which is black to the stigma; the abortive basal third of the third vein is traced by a very slender line, which appears to be more distinct than in any of the allied species; the abdomen is dusted

over with a white powder, with a black band on the hind part of each segment. Length to the tip of the abdomen 0.07 of an inch, to the tip of the wings 0.11 of an inch.

The gall which this species produces grows from the mid-rib of the leaf, slightly above the junction of the blade with the petiole. It grows either wholly on the upper side of the leaf, or with but a small portion protruding from the under side. The winged individuals, according to Dr. Fitch, are females, which produce eggs of a dull wax color, the eyes of the inclosed larva appearing like two black dots near one end. These eggs hatch in a few moments after they are deposited. These so-called eggs, by Dr. Fitch, are doubtless the thin egg-like sacks we have heretofore mentioned, in which the larvæ are inclosed; hence, this method of reproduction must properly be classed as viviparous, or, perhaps more correctly, ovi-viviparous.

80. *Pemphigus populi-venæ*, Fitch. The Poplar-vein Gall-louse.

This species forms an oblong, compressed, cockscomb-shaped gall on the mid-veins of the leaves of the balsam poplar. These are situated on the upper side of the leaf, with an orifice which opens on the under side; they are of a light red color, varied with yellow. The cavity within, as in the others, contains a number of lice. These galls are nearly semicircular, and half as high as they are long, being usually over half an inch in length, with an uneven surface, their walls thick and brittle. They are generally placed near the base of the leaf, though sometimes in its middle.

The following is a description of the species, as given by Dr. Fitch:

The female larvæ are dusky on the body and legs; and are quite small, measuring about 0.25 of an inch in length; straight along each side, and slightly narrowing from behind forward. The male larvæ are much less numerous than the females, and are double their size; are pale dull green, with whitish antennæ and feet.

The adult wingless female is as broad as long, measuring from 0.04 to 0.05 of an inch in length, the hind end being usually concave or notched, and the abdomen elevated or humped in the middle; pale dusky, with two rows of snow-white dots, formed of white powdery matter, along each side of the back, the dots of the inner row being more numerous than those of the outer row; head dark; legs dull yellow, and feet dusky.

The winged individuals black, with coarse thread-like antennæ, reaching to the base of the wings. The wings are pellucid and colorless, as are the oblique or discoidal veins; the rib-vein blackish, coarse and somewhat enlarged along the inner margin of the stigma; marginal vein blackish. Length to the tip of the abdomen, 0.05 inch; to the tips of the wings, 0.08 inch.

81. *Pemphigus hamamelidis*, Fitch. The Witch Hazel Gall-louse.

Inhabits conical follicles on the upper surface of witch hazel leaves; each follicle contains about a dozen individuals, and has a small orifice on the under surface of the leaf.

Males black, powdered; wings hyaline, with brown veins; legs whitish, knees and feet black. Length, 0.09 inch. Larvæ smaller and brownish.

This is placed by Dr. Fitch in the genus *Brysocrypta*, but appears to be so closely related to other species here included in *Pemphigus*, I have concluded to refer it to that genus for the present. It is possible that further investigation will prove it and *Hormaphis hamamelidis*, hereafter described, to be identical, notwithstanding the apparent generic differences.

The wings are pellucid and colorless, as are the oblique or discoidal veins; the rib-vein blackish, coarse and somewhat enlarged along the inner margin of the stigma; marginal vein blackish. Length to the tip of the abdomen, 0.05 of an inch; to the tip of the wings, 0.08.

82. *Thalaxes ulmicola*, Fitch. The Cockscomb Elm-gall Louse.

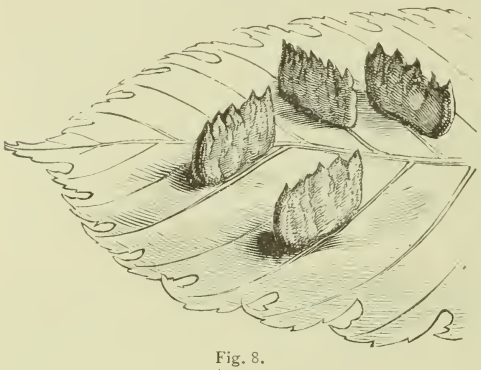

Fig. 8.

The genus to which this species belongs resembles *Eriosoma* in having the third vein of the fore wings once forked; but the hind wings differ in having but a single branch or discoidal vein; it also differs in placing the wings horizontally on the back, in repose, instead of erect.

This species forms the comb-shaped galls so common on the upper side of the leaves of young white elms. These galls are usually about an inch long, varying in height from one to three-quarters of an inch; compressed and grooved on the sides and perpendicular, showing tooth-like conical projections at the top; opening by a long slit on the under side. The inside is wrinkled perpendicularly into deep plaits, and occupied by one female and her projeny, some of which may often be seen strolling out upon the under side of the leaf. The young are quite small, oval and yellowish white, with blackish legs; the mature wingless female is about 0.07 inch long, oval and pale yellow, more or less coated above with white powder, legs and antennæ blackish.

Fitch placed this species in the genus *Byrsocrypta*, but Mr. Walsh, who had the good fortune to find some of the winged individuals, which Dr. Fitch did not see, has shown that it belongs to *Thelaxes*. The winged females, according to Walsh, are black and more or less primose.

83. *Adelges abietes?* (Pack.) The Spruce Adelges.

The genus to which this species belongs is distinguished by the broad and flattened form of its species, which usually attack coniferous trees.

The legs and antennæ are very short, often scarcely visible; the latter are five-jointed and slender. There are three discoidal veins, all simple and straight. There are no honey-tubes on the abdomen. They usually produce gall-like swellings on the twigs, some of which take the form of pine or spruce cones.

The species here given is mentioned by Packard, in his Guide, without name. I have added the specific name here given, provisionally and simply for present use. Packard states that he has found it in abundance on the spruce in Maine, where it produces swellings at the ends of the twigs, resembling in size and form the cones of the same tree.

84. *Hormaphis hamamelidis*, Ost. Sac. The Witch Hazel Plant-louse.

In this genus the wings are laid flat on the back, in repose, extending much beyond the body; the second discoidal vein appears to arise from the first, as though a branch of that vein; the third is obsolete at the base; the arc vein, at the tip, is here in the form of a fourth branch vein. The hind wing has a projection on the anterior margin; but one branch or discoidal vein. The honey-tubes are either small or obsolete; antennæ, short, from three to five-jointed. This species inhabits obliquely conical or horn-like galls on the upper side of the leaves of the witch hazel; opening, as usual, on the under side.

85. *Rhizobius lactucæl*, Fitch. Lettuce Earth-louse.

The species of this genus are characterized by the habit of residing under ground; being without honey-tubes; never, or at most very rarely, acquiring wings; and being always (?) viviparous and never produced from eggs; antennæ but five or six-jointed, the last joint being longer than those preceding it, and blunt at the end.

This species infests the roots of lettuce in great numbers, appearing early in the season, and, unless destroyed in some way, increasing in numbers with the age of the plant. The mature individuals are scarcely over one-twelfth of an inch long, oval in shape, whitish or pale yellow, having the body and antennæ dusted over with a white powder; the legs, dusky. It does not appear that the plant is seriously injured by these insects.

Genus PHYLLOXERA.

This genus, which has recently been brought into such prominence on account of the injury to grape vines by one of its species, is characterized as follows: Antennæ, three-jointed, the third or terminal joint much the longest; by carrying its wings overlapping and flat upon the back in repose; by being always oviparous, the agamic females never producing living larvæ. The veining of the fore wings appears to vary more than in the preceding genera, but the typical form is somewhat as in *Hormaphis*; the second discoidal vein arising from and as a branch of the first; the third, simple, and more or less complete or wanting; arc vein, at the apex, and the rib vein, sometimes more or less obliterated. Hind wings

with an angulated projection on the margin. Most of the species form galls on the leaves of plants, some also attacking the roots.

As a full account of the Grape Phylloxera, the only very important species, has been published in these Transactions, from Prof. Riley's Report, I will simply give the following catalogue of the American species as I find it in that author's Seventh Report.

86. *P. vastabrix*, Planch., (*Pemphigus vitifoliæ*, Fitch). The Grape Phylloxera.

Forming galls on the leaves and swellings on the roots of grape-vines.

87. *P. Rileyi*, Licht. The Oak-leaf Phylloxera.

Living on the under side of the leaves and hibernating on the stems of the white, swamp white and iron oaks (*Quercus alba*, *bicolor* and *obtusiloba*).

88. *P. caryæfoliæ*, Fitch. The Phylloxera of the Shag-bark Hickory-leaf.

Forming conical galls, which open on the summit, on the upper side of the leaves of the shag-bark hickory (*Carya alba*).

89. *P. caryæcaulis*, Fitch.

Forming elongate, rather irregular, but generally ellipsoid, smooth, green swellings, of large size, on the petiole or stalk of the leaves of *carya alabra* and *amera*, the galls opening in a small nipple on the under side.

90. *P. caryævenæ*. Fitch.

Forming plaits in the veins of the leaves of *Carya alba*, which plaits project upward from the surface in an abruptly elevated keel on the upper side of the leaf, the mouth opening on the under side, the lips of which are woolly.

91. *P. caryæ-semen*, Walsh.

Forming fuscous, minute, sub-globular, seed-like galls on the upper side of the leaves of the pignut hickory (*Carya globra*), which open in a small nipple on the under side.

92. *P. caryæ-globuli*, Walsh.

Forming hemispherical galls, about the fourth of an inch in diameter, on the upper surface of the leaves of *Carya globra* and *alba;* the galls rather flat below, where they open with a slit.

93. *P. spinosa*, Shimer.

Forming large, irregular galls, covered with spines, on the petiole of the leaves of *Carya amara* (bitternut hickory), the galls opening beneath with an irregular sinuate slit.

94. *P. caryæ-septa*, Shimer.

Forming flattened galls with a septum, on the leaves of *Carya alba*, which open both above and below.

95. *P. forcata*, Shimer.

Forming galls similar to those formed by *P. caryæ-semen*, but larger.

96. *P. depressa*, Shimer.

Forming depressed galls on the leaves of *Carya-alba*, which open below with a constricted mouth fringed with filaments.

97. *P. cornica*, Shimer.

Forming galls similar to the last, but without a fringe.

98. *P. caryæ-gummosa*, Riley.

Forming pedunculated, ovoid or globular galls on the under side of the leaves of *Carya-alba;* the gall white, pubescent and gummy or sticky, opening below in a fibrous point.

99. *P caryæ-ren*, Riley.

Forming numerous, more or less confluent, mostly reniform, galls on on the petiole of *Carya-alba;* green, densely pubescent, and opening with a slit the whole of their length and transversely to the axis of the petiole.

100. *P. caryæ-fallax*, Walsh.

Forming conical galls, thickly crowded on the upper surface of the leaves of *Carya-alba*. Strongly resembling *P. caryæfoliæ*, but the height one-third greater than the basal diameter, and opening below instead of above, in a circular, fuzzy mouth.

101. *P. castaneæ*, Hald.

This is the *Chermes castaneæ* of Haldemann, which Riley says is undoubtedly a Phylloxera; although I have not seen the description, I presume, from the name, that it infests the chestnut.

I think it probable, study of those insects found on the hickory leaves will show that a large portion of those given as distinct species are but varieties of one or two species.

102. *Chermes pinifoliæ*, Fitch.

This genus, as understood by Dr. Fitch, appears to include those species in which the female is oviparous, but does not extrude her eggs; but clinging to the leaf, the abdomen swells and finally she perishes, leaving

the mass of eggs adhering to the leaf, thus showing a close relation to the *Coccidæ*, or bark-lice. But on the other hand, the winged individuals possess four wings instead of two, which character places them among the Aphides. The further character will be found in the following specific characters of this species. The winged individuals, black, 0.08 inch in length to the tip of the abdomen, 0.12 inch to the tips of the wings; abdomen, dusky-red and slightly covered with down; the wings, dusky and grayish; the rib-vein of the fore wings runs straight to the outer margin forward of the tip, and gives off from its middle, on the outer side, a very oblique branch which runs to the outer margin, its tip producing a slight angular projection of the margin; on the inner side of the rib-vein there are three branches or discoidal vains, all simple, the third running to the tip of the wing. The hind wings have an angular point on the outer or front margin; the rib-vein sending off one branch; antennæ short, thread-like, and four or five jointed.

Found during the summer stationary upon pine leaves.

103. *Chermes laricifoliæ*, Fitch. The Larch Chermes.

Similar to the preceding species; but found on the leaves of the American larch or tamarack. Shining black, 0.10 of an inch long; abdomen, dark green; legs, pale or whitish; wings, nearly hyaline, with pale brown veins; the large stigma, opake and pale green.

CONCLUDING REMARKS.

As I have already given somewhat fully the general history of the *Aphides*, including an account of their singular mode of reproduction, also the methods adopted or that I had to suggest for their extermination, I will only add here some general remarks in reference to points not fully given, and some facts in reference to their history and operations in European countries where they have been more thoroughly studied than here.

Although most cultivated as well as uncultivated plants are more or less subject to the attacks of one or more species of plant-lice, yet in England, and I believe so far as observed in this country, clover appears to be singularly exempt. The potato, which is subject to the attacks of so many other insects, appears to have no plant-louse peculiar to it; occasionally it is attacked by the *Bean Aphis*, and some other species, sometimes, though very rarely in abundance. But even when this happens, they appear to do but little injury to the top and none to the tuber, their attacks having, as has been shown, nothing whatever to do with the rot. Curtis states that in 1847, when the Aphides were abundant in certain parts of England, destroying the bean crop, potatoes in the same gardens were not injured. Harris speaks of plant-lice which sometimes infest potato fields, but I suppose he alludes to the occasional visitations I have mentioned.

In this country the apple, cherry, currant, hickory, willow, grape, cabbage and a few other vegetables appear to suffer most from the attacks

of these insects; occasionally wheat and corn are injured somewhat seriously in certain localities. Green-house and other in-door plants, if not carefully watched, are likely to be injured by them, but a little precaution combined with a knowledge of the proper remedies and preventive measures in such cases generally suffice to eradicate them.

If the latter part of the winter is open and the spring warm, bringing them out in advance of their enemies, they are then more apt to be abundant and injurious than ordinarily, as they are thus enabled to get the start of the latter, and the ascendency thus obtained is not easily overcome. The true *Aphides* are generally quite sensible to cold, being largely destroyed by heavy frosts and severe cold spells; but, as has already been shown, there are exceptions to the rule; and it is more than likely that this result depends, in part at least, upon the effect the cold has upon the plant on which they reside. Some, and possibly most of the woolly species, appear to be less easily injured by the cold than the former; but it is quite natural this should be so, as the former reside chiefly on the foliage, while the latter are found chiefly on the stems, branches, trunks and roots.

It is supposed by many that the insects of this family are easily affected by water, but Curtis states that he "has been surprised to see how slightly they are affected by wet;" that "some *Aphides* attached to a willow twig were immersed in water for sixteen hours, which did not appear to incommodate them in the least, for, on being taken out and placed in the sun, they increased and multiplied shortly afterwards." Yet other species immersed but for twelve hours were destroyed, showing a wide difference in species, in this respect. The experiments tried in France upon the Grape Phylloxera indicate the inefficiency of this agency in destroying this pest, as will be seen from an extract hereafter given.

The author quoted above also further remarks that "their capability of resisting some gases or effluvia is very astonishing; for instance, I corked some up in a quill containing a piece of camphor, which produced an atmosphere that killed most insects in an hour, but the Aphides were walking about unaffected after being confined there for twenty-four hours." The fumes of tobacco and sulphur are, perhaps, the most potent gaseous agencies in destroying them which are susceptible of general practical application. Alkaline substances in powder or solution, acrid solutions, kerosene and oils, are generally fatal to them, if they can be applied directly.

Dr. Harris states that "lice multiply much faster, and are more injurious to plants, in a dry than in a wet atmosphere." That, as a general rule, plants are more easily injured in dry than in moist weather is undoubtedly true; but, as to the other part of the statement, I think he is certainly mistaken, as a rule, for there is scarcely an individual, who has paid any attention to this matter, that is not aware that a warm humid atmosphere is favorable to their increase; yet there are some species which appear to be more abundant in dry seasons. Curtis, the great English entomologist, from whose writings I have already quoted, remarks, in speaking generally of the Aphides: "Their increase in damp and sultry

weather is equally surprising ; and the universal diffusion of such myriads, soon after a thunder storm, has led, as with the black caterpillars, to the vulgar error of their having fallen from the clouds." He thinks it probable that electricity also assists in their rapid and sudden development, sometimes observed. It is proper to state that Dickson, in his "Practical Agriculture," remarks that, "In such summers as are dry, beans are frequently liable to be much injured by the attacks of the *Black Fly*, or what is often termed the *Dolphin*, the whole field in particular cases being in danger of being destroyed in the course of a few days." *Black fly*, *black dolphin* and *collier* are terms applied in England to a variety of the Bean Aphis. It is not stated here that it is the universal increase of these insects that renders the beans more liable to destruction in dry than wet seasons ; it is more than probable the weakened vitality, caused by want of moisture, has much to do with it.

One instance has been recorded of a remarkable migration of these insects, which occurred in Belgium. M. Morren, who records the fact, says that the winter of 1833–4 was very mild, and the summer following very hot and dry. That in September the plant-lice (*Aphis persicæ*) suddenly appeared in immense numbers, resembling the locust emigrations, the flying hordes even obscuring the sun, and entirely covering the sides of the house where they alighted. It is stated by another authority that they were carried thither by a hurricane.

The fact that ants attend the species which give forth a saccharine fluid from honey-tubes, for the purpose of obtaining this food, and the fact that the lice permit their attention and caresses without objection, are too well known to need further mention.

As a rule, the remedies applicable to one species are equally applicable to another of similar habits, where the one is as easy of access as the other. But the measures so far suggested apply almost exclusively to species that operate on the surface of the foliage, branches, trunk or roots, and not to those which inclose themselves in galls ; fortunately, the latter are not often injurious to growth, though giving the tree or plant they infest an unsightly appearance. The attention which has lately been called to the Grape Phylloxera, in this country and France, especially the latter, has brought to light many facts with reference to remedial and preventive measures applicable to root-lice, of great value. I therefore give here a *resume* of the results of the experiments tried under the supervision of the Academy of Sciences of France, upon the Phylloxera of the Grape, copied from *Nature*, No. 375, January 4, 1877 :

"Some time ago we published in our columns a short account of the results of the investigations of various scientific men in France into the nature of the Phylloxera—that terrible scourge which is committing such wide-spread ravages among the French vineyards. Latterly we have received some reports communicated to the French Academy of Sciences, dealing with the attempts which have been made during the last three or four years to arrest the mischief done by the insect, and ultimately to destroy it altogether, by means of some potent drug. It is obvious that the remedy to be employed must possess two qualities at starting, viz.,

it must destroy the insect, and it must not damage, to any great extent, the vine. But, further, it is not sufficient that when put in close contact with the roots of a plant—as in a pot—it should prove fatal to the insect ; it is necessary, if the remedy is to be of real practical value, that it should reach and destroy the Phylloxera on all the parts attacked by it in vines which are planted out in the open air. This is a real difficulty to overcome, as the remedy, be it in the form of solution or of vapor, cannot easily permeate the soil, sometimes clayey, sometimes sandy, on which the vine is growing, so as to reach and act upon the smaller root branches whose nutrition the Phylloxera diverts into itself.

"M. Mouillefert, a professor at the School of Agriculture at Grignon, was the gentleman delegated by the Academy of Sciences to make the necessary experiments for the purpose of determining what agent was the most practically applicable to the destruction of the Phylloxera; and the account of the numerous substances employed by him, with varying results, fills no less than two hundred pages of a memorial presented to the Academy of Sciences. It is not our intention here to give more than a brief *resume* of the results at which he arrived.

"He divides the substances used by him into seven groups, the first of which was composed of manures of various kinds, such as guano, superphosphates, farm muck, etc.; the second, of neutral substances, as water, soot and sand; the third, of alkalies, as ammonia and soda; the fourth, of saline products, among which were the sulphates of iron, copper, zinc, potassium and ammonia, alum and sea salt; the fifth, of vegetable essences and products, as decoctions of hemp, datura, absinthe, valerian and tobacco; the sixth, of empyreumatic products; and the seventh, of sulphur compounds. It was with some of the substances contained in this last group that really satisfactory results were obtained; and it is to M. Dumas, the Permanent Secretary of the French Academy of Sciences, that the credit is due for suggesting the employment of the alkaline sulpho-carbonates of potassium and sodium, and those of barium and calcium. All the other classes of remedies mentioned above were either without effect on the Phylloxera, or, in destroying it, also destroyed or damaged the vine.

"The sulpho-carbonates, which were carefully studied by the great Swedish chemist, Berzelius, are obtained by combining the alkaline monosulphides with the bi-sulphide of carbon, are either liquid or solid, and emit a powerful odor of sulphuretted hydrogen and bi-sulphide of carbon.

"The alkaline sulpho-carbonates, in the solid state, are of a beautiful reddish-yellow color and deliquescent, but are not easily obtainable in that condition; the sulpho-carbonate of barium can be easily produced, however, in a solid state, and presents the appearance of a yellow powder, but little soluble in water. The sulpho-carbonates decompose under the influence of carbonic acid, forming a carbonate, and evolving sulphuretted hydrogen and bi-sulphide of carbon. These two latter substances are gradually liberated, and as they have a very powerful effect on the Phylloxera, one can understand that the sulpho-carbonate, placed in the ground, may prove, by its slow decomposition, a powerful insecticide.

In the case of the sulpho-carbonate of potassium, over and above its toxic effect, it has a direct invigorating influence upon the vine, as the carbonate of potassium is an excellent manure.

"The employment of the sulpho-carbonates as a means for the destruction of the Phylloxera was suggested to M. Dumas by the clearly recognized need that there was for some substance that would evaporate less quickly than the bi-sulphide of carbon; he saw that it was necessary to apply the insecticides in some combination which would fix them and only allow them to evaporate gradually, so that their action might continue long enough in any one place to infect with their vapors all the surrounding soil.

"But the task of eradicating the Phylloxera has by no means been accomplished by the mere discovery of the value for the purpose of these substances; there is the further difficulty of applying them to the vine in cultivation. One thing seems very certain, that in order to render the sulpho-carbonates available they should be reduced to a powder and spread over the ground before the heavy rains, that is, between October and March, which will probably prove very efficacious.

"The conclusion at which M. Mouillefert arrives at the end of the report, is that the efficacy of the sulpho-carbonates is proved, and all that is necessary is to bring to perfection their employment in agriculture, which can only be accomplished by the intelligence and practical knowledge of the vine-grower, who is well able to discover the economic processes of culture which are conducive to their successful application.

"He ends by saying that 'Scence has accomplished its mission, and it remains for Agriculture to fulfill its part in the eradication of the Phylloxera from the vineyards of France.'"

A LIST OF THE VARIOUS PLANTS MENTIONED, WITH THE SCIENTIFIC NAMES OF THE PLANT-LICE INFESTING THEM.

Alder. Lachnus alnifoliæ; Eriosoma tessellata.
Almond. Aphis amygdali.
Apple, root. Eriosoma lanigera (Pemphigus pyri).
trunk and branches. Eriosoma lanigera.
leaves and twigs. Aphis mali.
leaves. Aphis malifoliæ.
Asclepias. (See Milkweed.)
Balm of Gilead. Aphis candicans.
Balsam Poplar. Pemphigus popularia; P. populi-globuli; P. populi-venæ.
Barley. Aphis avenæ.
Bean. Aphis rumicis.
Beech. Eriosoma imbricator.
Berberry. Aphis berberidis.
Birch. Apis betulæcolens.
Blackberry. Aphis rubi.
Bramble. Aphis rubi.
Cabbage. Aphis brassicæ.
Calamus. Diraphia calamorum; D. maculipennis.
Carrot. Aphis dauci.

Cherry. Aphis cerasi.
Cherry, Black. Aphis cerasicolens.
Chestnut. Phylloxera castaneæ.
Corn. Aphis maidis.
Cottonwood. Pemphigus vagabundus; P. populicaulis.
Cranberry (High). Aphis viburni.
Currant. Aphis ribis.
Dahlia. Aphis rumicis.
Dogwood. Aphis cornifoliæ.
Elder. Aphis sambercifoliæ.
Elm. Eriosoma Rileyi; Thalaxis ulmicola; Lachnus ulmi; Pemphigus ulmi-fusus.
Fir. Lachnus abietis.
Flag, Sweet. (See Calamus.)
Galium. Aphis circizandis.
Golden Rod. Aphis rudbeckiæ.
Grape Vines. Phylloxera vastatrix.
Hackberry. Psylla ——? (Gall maker.)
Hazel. (See Witch Hazel.)
Hickory. Aphis caryella; A. punctatella; A. maculella; A. fumipennella; A. marginella; Lachnus caryæ; Phylloxera caryæcaulis; P. caryæ-venæ; P. caryæ-semen; P. spinosa; P. caryæ-globuli; P. caryæ-septa; P. forcata; P. depressa; P. caryæ-gummosa; P. fallax; P. caryæ-ren.
Hop. Aphis humuli.
Hornbeam. Psylla caprini.
Juniper. Aphis juniperi.
Kale. Aphis brassicæ.
Knotweed. Aphis polygoni.
Larch, American. Lachnus laricifex; Chermes laricifoliæ.
Larch, European. Lachnus laricis.
Lettuce. Aphis lactucæ: Rhizobius lactucæ.
Maple, Sugar. Psylla annulata.
Milkweed. Aphis asclepiadis.
Nettle. Psylla urticæcolens.
Oak. Lachnus quercifoliæ; Eriosoma querci; Phylloxera Rileyi.
Oats. Aphis avernæ.
Parsnip. Aphis pastinaceæ.
Peach. Aphis persicæ.
Pear. Psylla pyri.
Pine. Diraphia vernalis; D. femoralis; Aphis pinicolens; Lachnus strobi; L. pini; Eriosoma strobi; Chermes pinifoliæ.
Plum. Aphis prunifoliæ.
Poppy. Aphis rumicis.
Rose. Aphis rosæ.
Rudbeckia. Aphis rudbeckiæ.
Ruta-baga. Aphis rumicis.
Rye. Aphis avenæ.
Sorrel. Aphis rumicis.
Spruce. Lachnus abietis; Adelges abietis.
Strawberry. Aphis (Siphonophora) fragariæ.
Sumac. Pemphigus rhois.
Tamarack. (See Larch, American).
Tansy. Aphis (Siphonophora) absinthii.
Thorn. Aphis cratægifoliæ.
Turnip. Aphis brassicæ.
Wheat. Aphis avenæ.
Willow. Lachnus dentatus; L. salicelis; L. salicicola.
Witch-Hazel. Pemphigus hamamelidis; Hormaphis hamamelidis.

A LIST OF THE SPECIES OF PLANT-LICE MENTIONED, WITH THE NAMES OF THE PLANTS THEY INFEST. THE GENERA ARE ARRANGED SYSTEMATICALLY, BUT THE SPECIES ALPHABETICALLY, UNDER THEIR RESPECTIVE GENERA.

1. Diraphia calamorum. Calamus (Sweet-flag).
2. fernoralis. Pine leaves.
3. maculipennis. Calamus (Sweet-flag).
4. vernalis. Pine leaves.
5. Psylla ——— ? Alder.
6. annulata. Sugar maple
7. ——— ? Birch.
8. carpini. Hornbeam.
9. ——— ? Hackberry, forming galls.
10. pyri. Pear, leaves and twigs.
11. quadrelineata. Unknown.
12. quadrisignata. "
13. rubi. Blackberry, suckers and shoots.
14. trilineata. Unknown.
15. urticæcolens. Nettle.
16. Aphis aceris. (Aceris pennsylvanica).
17. amygdali. Peach and Almond, leaves.
18. asclepiadis. Silkweed, leaves.
19. berberidis. Berberry, leaves.
20. betulæcolens. Birch.
21. brassicæ. Cabbage, Kale and Turnip.
22. candicans. Balm of Gilead, leaves.
23. caryella. Hickory, leaves.
24. cerasi. Cherry, leaves and twigs.
25. cerasicolens. Black cherry.
26. circezandis. Galium.
27. cornifoliæ. Dogwood, leaves.
28. cratægifoliæ. Thorn, leaves.
29. dauci. Carrot, umbels.
30. fumipennella. Hickory, leaves.
31. maculella. Hickory, leaves.
32. maidis. Corn, ear stalks and roots.
33. mali. Apple, leaves and twigs.
34. malifoliæ. Apple, leaves.
35. marginella. Hickory, leaves.
36. pastinaceæ. Parsnip.
37. persicæ. Peach, leaves.
38. pinicolens. Pine.
39. polygoni. Knotweed.
40. populifoliæ. (Populus grandidentata,) leaves.
41. prunifoliæ. Plum, leaves.
42. punctatella. Hickory, leaves.
43. rudbeckiæ. Golden-rod and Rudbeckia, stalks.
44. rumicis. Bean, Sorrel, Burning-bush, Poppy, Pig-weed, Shepherd's-purse, Dahlia.
45. sambucifoliæ. Elder, leaves.
46. viburni. High cranberry, fruit stalks.
47. Phopalosiphum ribis. Currant, leaves.
48. Siphonophora absinthii. Tansy and other aromatic herbs.
49. avenæ. Wheat, Oats, Rye, Barley.
50. fragariæ. Strawberry plants.

51. Siphonophora lactucæ. Lettuce, leaves.
52. rosæ. Rose, tender shoots.
53. rubi. Blackberry bushes.
54. Lachnus abietis. Spruce (Abies nigra), leaves.
55. alnifoliæ. Alder, leaves.
56. caryæ. Pig-nut hickory, branches.
57. dentatus. Gray willow, branches.
58. juniperi. Juniper.
59. laricifex. Larch (Tamarack), twigs.
60. laricis. European larch.
61. pini. Pine.
62. populi. —— ——.
63. quercifoliæ. White oak, leaves.
64. salicelis. Willow, branches.
65. salicicola. Willow, branches.
66. strobi. White pine, tips of branches.
67. ulmi. Elm, leaves.
68. Eriosoma imbricator. Beech, branches.
69. lanigera. Apple, trunk and roots.
70. querci. Oak, limbs.
71. rileyi. White elm, trunk and limbs.
72. strobi. White pine, branches.
73. tessellata. Alder, branches.
74. Pemphigus hamamelidis. Witch-hazel, conical galls on the leaves.
75. popularia. Balsam poplar.
76. populicaulis. Cottonwood, galls on the leaves.
77. populi-globuli. Balsam poplar, bullet galls on the leaves.
78. populi-venæ. Balsam poplar, compressed galls on the leaves.
79. rhois. Sumac, galls on the leaves.
80. ulmi-fusus. Red elm, spindle galls on the leaves.
81. vagabundus. Cottonwood, irregular galls on end of twigs.
82. Thalaxes ulmicola. White elm, cockscomb galls on the leaves.
83. Adelges abietis. Spruce, galls or swellings on the twigs.
84. Hormaphis hamamelidis. Witch-hazel, conical galls on the leaves.
85. Rhizobius lactucæ. Lettuce, roots.
86. Phylloxera caryæcaulis. Pig-nut hickory, elongate swellings on the leaf-stalk.
87. caryæ-fallax. Shag-bark hickory, conical galls on the leaves.
88. caryæ-foliæ. Shag-bark and Bitter-nut hickories, conical galls on the trees.
89. caryæ-globulis. Shag-bark and Pig-nut hickories, globular galls on leaves.
90. caryæ-gummosa. Shag-bark hickory, pedunculated galls on leaves.
91. caryæ-ren. Shag-bark hickory, galls on leaf-stalk.
92. caryæ-semen. Pig-nut hickory, seed-like galls on the leaves.
93. caryæ-septa. Shag-bark hickory, flattened galls on the leaves.
94. caryæ-venæ. Shag-bark hickory, plaits in leaf-veins.
95. castaneæ. Chestnut, galls on leaves.
96. conica. Shag-bark hickory, flattened galls on the leaves.
97. depressa. Same as last.
98. forcata. Same as last.
99. rileyi. White, Swamp White and Iron oaks, galls on leaves.
100. spinosa. Shag-bark and Pig-nut hickories, irregular spiny galls on leaves.
101. vastatrix. Grape vines, galls on leaves and swellings on roots (Grape Phylloxera).
102. Chermes laricifoliæ. Larch (Tamarack), leaves.
103. pinifoliæ. Pine, leaves.

A SYNOPTICAL TABLE OF THE GENERA MENTIONED, ARRANGED ACCORDING TO THE SCIENTIFIC CHARACTERS.

I. Saltatorial; antennæ, with two bristles at the tip.
  a. Antennæ longer than the head and thorax, neither the first nor second joint elongated; head slightly cleft in front.—*Psylla.*
  aa. Antennæ short; first joint elongated; head rather deeply cleft in front.—*Diraphia.*
II. Non-saltatorial; antennæ not tipped with two bristles.
A. Abdomen furnished with honey-tubes; third discoidal veins of the fore wings twice forked.
  b. Honey-tubes never reduced to mere tubercles; found chiefly on leaves.—*Aphis.*
  bb. Honey-tubes reduced to mere tubercles; chiefly found on limbs, twigs or stems; abdomen usually (not always) with transverse rows of dots.—*Lachnus.*
AA. Abdomen without honey-tubes or tubercles; third vein of the fore wings only once forked, simple, or obliterated; or wingless.
  c. Some individuals acquiring wings; never residing wholly underground.
  d. Wings erect in repose.
  e. Third vein simple.—*Eriosoma.*
  f. Legs and antennæ of moderate length; latter more than five-jointed; body not broad and flat.—*Pemphigus.*
  ff. Legs and antennæ very short; latter but five-jointed; body broad and flat.—*Adelges.*
  dd. Wings horizontal in repose.
  g. Third discoidal vein of the fore wings once forked.—*Thalaxes.*
  gg. Third discoidal veins of the fore wings simple or obsolete; hind wings with an angular point on their outer margin.
  h. Hind wings with one discoidal or branch vein; antennæ three to five-jointed.
  i. Females become stationary and die without extruding their eggs; third discoidal vein extends to the tip of the wings; antennæ four or five-jointed.—*Chermes.*
  ii. Females deposit their eggs (?); third discoidal vein sub-obsolete, not running to the tip of the wings; antennæ three to five-jointed.—*Hormaphis.*
  hh. Antennæ three-jointed; hind wings with no discoidal or branch vein.—*Phylloxera.*
  cc. Never acquiring wings (so far as known); living wholly underground.—*Rhizobius.*

It is not claimed that this table is more than approximately correct; it is given simply as one means of aiding in determining species. The genera *Rhopalosiphum* and *Siphonophora* are included under *Aphis* as subgenera.

ADDENDA.

Since the foregoing was written, I have succeeded in obtaining a brief synopsis of Passerini's arrangement of the Aphidæ, which is as follows:

APHIDIDÆ, Passerini.—(Tribes.)

A. Antennæ seven-jointed.—(1) APHIDINÆ.
AA. Antennæ six-jointed, at least in the winged form.

a. Winged form obvious, or at least known.
b. Cubital vein once forked or simple.—(3) PEMPHIGINÆ.
bb. Cubital vein twice forked.—(2) LACHNINÆ.
aa. Winged form unknown.—(4) RHIZOBIINÆ.
AAA. Antennæ five or only three-jointed.
a. Winged form unknown.—(5) TYCHEINÆ.
aa. Winged form obvious, or at least known.—(6) CHERMESSINÆ.

Tribe I. APHIDINÆ.—Genera.

A. Antennæ on a frontal tubercle.
a. Antennæ closely approximate at base, front grooved.—*Siphonophora.*
aa. Antennæ remote at base, front flat or convex.
b. First joint of the antennæ with a tooth on the inside.—*Phorodon.*
bb. First joint of the antennæ not toothed.
c. Nectaries or honey-tubes distinctly clavate.—*Rhopalosiphum.*
cc. Nectaries cylindrical, sometimes hardly attenuated at the base, more often incrassated.
d. Cubital vein twice forked.
e. Tail much shorter than the nectaries.—*Myzus.*
ee. Tail longer than the nectaries, rarely equal to them in length.—*Hyalopterus.*
dd. Cubital vein once forked.—*Toxoptera.*
AA. Antennæ not on a frontal tubercle.
a. The seventh joint of the antennæ as long or longer than the sixth.
b. Antennæ smooth.
c. Nectaries longer than thick, or if shorter, or none, then the wingless female has a smooth back.
d. Nectaries cylindrical (very rarely none).—*Aphis.*
dd. Nectaries clavate.—*Siphocoryne.*
cc. Nectaries shorter than thick, or if a little longer, then the wingless female has a hairy back.—*Myzocallis.*
bb. Antennæ pilose.
e. Nectaries cylindrical, or at least twice longer than thick.—*Gladobius.*
ee. Nectaries tubercle shape, much shorter than thick, sometimes almost on a level with the surface.—*Chaitophorus.*
aa. The seventh joint of the antennæ shorter than the sixth.
f. Species ærial; winged form elegant.—*Pterocallis.*
ff. Species subterranean; winged form unknown.
g. The third joint of the antennæ longer than the fourth; hind tarsi one-jointed.—*Trama.*
gg. Third joint of the antennæ as long as the fourth; hind tarsi two-jointed.—*Paracletus.*

Tribe II. LACHNINÆ.

A. Sixth joint of the antennæ setaceous.—*Sipha.*
AA. Sixth joint of the antennæ filiform or clavate, often ending in a spur, like a rudimentary joint.
a. Fourth vein of the fore wings nearly straight; stigma linear.—*Lachnus.*
aa. Fourth vein of the fore wings curved; the stigma trapezoidal.
b. Abdomen bare.
c. Rostrum short, not extending to the middle legs.—*Callipterus.*
cc. Rostrum more or less long, extending at least to the hind legs.—*Pterochlorus.*
bb. Abdomen woolly.—*Phyllaphis.*

Tribe III. PEMPHIGINÆ.

A. Cubital vein forked at the tip.—*Schizoneura.*
AA. Cubital vein simple.
a. Hind wings with two oblique veins.—*Pemphigus.*
aa. Hind wings with one oblique vein.
b. Wings deflexed in repose.—*Tetraneura.*
bb. Wings horizontal in repose.—*Aploneura.*

Tribe IV. RHIZOBIINÆ.

A. Third joint of the antennæ much longer than the fourth.—*Forda.*
AA. Third and fourth joints of the antennæ nearly equal in length.—*Rhizobius.*

Tribe V. TYCHEINÆ.

Only one genus in the tribe.—*Tychea.*

Tribe VI. CHERMESSINÆ.

A. Antennæ five-jointed.
a. Fore wings with four oblique veins; the cubital vein forked.—*Vacuna.*
aa. Fore wings with three oblique simple veins.—*Chermes.*
AA. Antennæ three-jointed.—*Phylloxera.*

As I expect in my next report to give a more complete account of these insects, and to arrange according to the latest authority, I will not attempt at present to arrange the species mentioned in this paper under Passerini's divisions and genera. I will only add that in this synopsis *Schizoneura* corresponds with *Eriosoma*, as I have given it; *Vacuna* to *Thelaxes*; and *Adelges*, as I have used it, is probably included in *Chermes* by Passerini.

PROF. T. J. BURRELL'S REPORT ON BOTANY.

INJURIOUS FUNGI.

What follows is a partial account of the microscopic, destructive fungi observed at the Illinois Industrial University during the summer of 1876. Few of the observations are deemed complete, but are free from speculations or guesses not having an actual basis of known fact:

The Austrian pines presented a pitiable appearance during the summer and autumn, not improved during the winter, but less noticeable on account of the unlooked-for green at this season. The leaves die first at the outer ends or tips, and gradually turn yellow downward until the whole is dead and drops from the tree. The lower limbs are usually attacked first. Upon examination, small black specks are seen, ultimately raised above the general surface, finally rupturing the epidermis of the leaf by one or more longitudinal slits. Taking now such a leaf to the microscope, and, after making an exceedingly thin, transverse section with a razor through a black spot and submitting it to a power of one hundred or more diameters, we shall be rewarded by a most beautiful sight. The black substance is seated in the cup-like hollow, which it has made for itself in the tissue of the leaf, and by its own growth swells out so as to raise and break the epidermis, as stated. At maturity this black material is a mass of spores, originating from threads (*mycelium*) which traverse the cells of the leaf, and rising in ranks on the concave surface of the little pit or excavation. These spores are peculiar enough, resembling in shape an ordinary ball-club, but more swollen above. The lower handle part is transparent, the enlarged part black with four rings, really transverse divisions of the spore, a transparent conical tip, at the very point of which are three or four ribbon-like streamers half as long as the enlarged part of the spore. There are hundreds of these in each postule or spot.

But a large proportion of these spots have altogether different contents. The general appearance is the same, but instead of the pedantic-looking spores above described, myriads of excessively minute, rounded bodies are produced, which are seen under a high power to have a swinging or oscillating motion, as though fastened by a short, flexible string, and trying to free themselves. Such organisms are found in a large number of fungi, especially such as abound upon leaves and twigs, but never

have been described, to my knowledge, along with the first mentioned spores. They almost surely point to another form of spores borne in sacks (*asci*), which, so far, have not been found, and it is here strongly suspected that all these three belong to the same parasitic plant. In that case, the former will be denominated *stylospores*, the second minute moving bodies *spermatia*, and the third, now only surmised, *ascospores*. The first and third are reproductive germs. The second have usually been thought by botanists to be connected in some way with the process of fertilization, but have recently been seen to germinate, thus, probably, throwing them into the same category of the others. With such modes of reproduction, no wonder the parasites thrive on every accessible leaf. Curiously enough, the very nearly related Scotch pine (*Pinus sylvestris*), though growing by the side of a diseased Austrian, is not injured. It is quite possible that the spores only escape from old leaves after falling, and that this is the cause of the lower parts of the tree suffering first. If so, an easy remedy is suggested: gathering and burning the old leaves. As these, in the case of the pines, do not become much scattered by the winds, it would be possible to do this. But the whole matter demands further investigation.

Towards autumn, the leaves of the common rose presented, in very many instances, a brown, sickly appearance, after falling, leaving the stem naked weeks before this should have occurred. Upon examination with a pocket-magnifier, minute black specks were observed, and a higher magnifier revealed the presence of another very pretty miscroscopical object, known in the books as *Phragmidium mucronatum*, Lk. or Rose brand. At an earlier season, no doubt, these same leaves had small *yellow* spots, instead of the black ones spoken of, for this parasite, also, has two forms of "fruit." The first and earliest is composed of minute, oval, smooth, orange-colored bodies, in great numbers, rising from mycelium threads which imbed themselves in the tissues of the leaf, and by this growth rupture the epidermis and are dispersed. From the same threads and in the same pustules the dark-colored very different spores first mentioned appear in September. If those from the Austrian pine may be compared to an ordinary base-ball "bat," these may be called Indian war clubs. The handle part is nearly two thirds the entire length, is almost transparent, very much swollen below, and having in the center of this enlarged part a golden line, perhaps we might say "pith." This handle bears above a portion two or three times its own diameter, quite black, covered with prickly warts, and divided transversely into seven to eleven segments, each of which is quite distinct. At the upper end is a short, blunt, hyaline appendage. There is scarcely a doubt but that these last described spores (*pseudospores*) exist unchanged over winter and germinate in the spring. I do not know whether they immediately affect rose leaves again, or whether, as in so many instances, a species of alternate generations exists, a crop of spores in spring being produced upon some other plant. One thing deserves mention. In Europe these spores are said to have only from five to seven cross partitions, while ours have, as stated, seven to

eleven, though there is very little doubt about the identity of the species. No remedy is known. Similar species are found upon the raspberry and the strawberry leaves, but were not noticed by us last year.

Rust upon wheat and oats was particularly common in July of last year. This is the disease affecting the leaves and stems, not the head. In England, and sometimes with us, it is called *mildew*. The first form of spore is not far from spherical, and of a reddish-brown color, as may easily be seen from the dust on one's clothes if the stalks are brushed against them. The second spores are very dark colored, cut in two by one cross partition, and stalked or "handled." This same parasite is found upon the leaves, etc., of many grasses, including the common "tickle grass" (*Panicum capillare*), and on the leaves of corn or maize. Its life-history needs fuller investigation. According to De Bary, a careful German experimenter, in one stage it infests the common barberry, and the idea prevails that plants of this latter shrub are thus bad neighbors for wheat. At any rate, no one has proved conclusively how the spores behave in making their start upon the wheat plant, but it seems impossible that they, in this country, should be dependent upon the barberry in one stage of their existence. May be some other plant answers the purpose as well, and finding this, may lead to a preventive. Certainly no washes applied to the seed can do any good against the ravages of this scourage, for the spores are not in or on the seed, but exist over the winter in the fields on stubble, old grass, corn-stalks, etc. There is scarcely a doubt if all these were carefully burned, and similar care taken as to manure from animals fed upon affected straw, etc., something like protection would be attained. The scientific name is *Puccinia graminis*.

Two other fungi affect the wheat, though much less destructive, than the foregoing. These are "bunt" (*Tilletia caries*, Tul.), and "smut" (*Ustilago carbo*, Tul.) The former can only be detected when the grain is matured, except by a practiced eye, and is confined, so far as the spores are concerned, to the kernel. The vegetative threads, however, penetrate, and ramify through and through the tissues of the plant. If an affected kernel is pressed between the thumb and finger, the whole will be reduced to a black, ill-smelling mass, made up almost wholly of spores, which, by their germination, give rise again to the disease. The latter shows itself plainly enough while the grain is standing, the heads or ears looking slim and poor, covered at last by a sooty powder. This is properly called "smut," from the black powder or mass of spores. These are excessively minute, something like eight millions of them placed side by side to the square inch. The black, sooty masses upon maize are spores of a closely allied species. For these two wheat diseases, and probably that of corn, provided affected stalks are not left in the fields, washing or other cleansing of the seed is useful and may be thoroughly effective. The former is especially by this means readily mastered.

The leaves of sunflowers and Jerusalem artichokes were very badly rusted, and many plants killed outright, by a similar fungus to that of the

wheat rust, and known as *Puccinia helianthi*, Schw. The leaves, often both sides, are quite brown from the numerous pustules. They wither upon the stem, and finally break to pieces, scattering far and wide the reproductive germs.

Red cedar trees bear upon their branches reddish coppery-colored balls, which at a certain time in the spring, during rain, give rise to numerous gelatinous, sprawling, yellow appendages, then very conspicuous, and often thought to be the true fruit of the tree. This fungus, (*Gymnosporangium*, ——,) is, different as it appears, a near relation to the Puccinia of the wheat, the spores being borne in the gelatinous arms. The mycelium (threads) appear to be perennial, robbing the bark and young wood of the prepared sap, and storing up the nutriment in these galls for its own fruiting. The tree does not immediately perish, but is evidently enough weakened, and as the robber increases from year to year, if allowed to do so, the resources are at length exhausted, and death ensues. If, however, the balls are gathered and burned, the difficulty is obviated.

The leaves of beans, especially of the pole varieties, were seriously injured by a rust which appears as minute black specks, pretty thickly distributed, generally upon the under surface. The leaves appear sickly, and ultimately wither away, remaining attached to the stem until broken off. The black specks are composed, as is so often the case, of spores. Under the microscope these are seen to have a long stem, terminated by an undivided, rounded head (spore) with a blunt apical appendage. No less than four kinds of "fruit" is known to be produced by this fungus (*Uromyces appendiculata*), but in this case the one described is the only kind found. These doubtless are the winter spores, which by their germination start the series the following season. Here again burning affected plants might prevent ravages another year.

Cottonwood trees drop their leaves sometimes very early in the fall, and it does not require very sharp looking to discover thickly sprinkled over, or under, the surface orange colored dots. Willows have the same thing happen to them. But for the injurious effects of the parasite here, these trees would hold their leaves much later, and profit thereby. As ornamental trees, this premature shedding of the leaves is a decided disadvantage. Two forms of spores are produced, the first kind maturing in late summer and making up the orange dots observed; the second, curiously enough, are developed after the cold weather sets in, while the dried leaves are lying upon the ground. If such leaves are examined during winter they will be seen as thickly sprinkled with dark brown dots as the green ones were with orange. Each dot, though barely visible to the eye, contains some hundreds of oblong spores, packed as close as kernels of corn upon its cob, ends outward. These germinate in the spring, and being carried in the air, gain access to the young leaves. Before it was known that the two kinds of spores belonged to the same fungus, the first sort was classed, with its congeners, under the generic name of *Lecythea*, and the latter was, as it still is, known as *Melamspora*

populina; but as one name for one plant is enough, especially when it happens to be so long, the first has fallen into disuse. There are, however, instances in which, so far as is known to the writer, the second form of fruit (winter spores) is not produced, hence the name may yet be preserved for such species. Before leaving this subject, it should be mentioned that the Lombardy poplar is attacked by the same destroyer, and this may be one of the reasons of its short life.

Clover, both white and red, but especially the former, was the host during the whole summer of a parasite quite different to any of the above. This formed small black dots on the leaves, so readily seen that few persons who take the trouble to read this account could have missed observing them. Each sooty spot is made up of dark-colored pointed or beaded threads, closely crowded together, but well filled in with oval once-partitioned spores. The beaded threads rise perpendicularly to the leaf, and the spores appear as if sifted down among them. No doubt, however, they would be seen borne on the threads, if the manipulation should be delicate enough to show them without disturbance. The name is *Polythrincium trifolii.* But this is probably only a first form, another form, quite commonly found with this, bearing the cognomen of *Dothidia trifolii.* Not uncommonly, as a thin section of one of the dots is submitted to the microscope, myriads of minute moving particles are seen, which are supposed to be the *spermatia* of the latter, and very similar to those described in the Austrian pine fungus. An interesting question in regard to the "slobbering" of the clover-fed horse here presents itself. Is this the result of this fungus? It is well known that the phenomenon does not appear until about the time of flowering of the clover, but it is not so well known that the flowers themselves are in any way connected therewith. The microscope will doubtless some day determine this matter.

The parasites now classed in the family *Peronosporeæ*, and in the two genera *Peronospora* and *Cystopus*, are among the worst pests of the fields and gardens. Those of the former genus are especially destructive. They blight like contagion, and wither like death itself. Over forty species of the Peronosporas are known in Europe, while only six have so far been observed in this country, three of which came under the notice of the writer within the limits of time fixed for this paper. These are *Peronospora infestans*, on potatoes and tomatoes; *P. gangliformis*, on lettuce; and *P. viticola*, on grapes. The species of the genus Cystopus do not seem to have the destructive effects of the former, yet must cause much loss of vitality to the supporting plants. They appear as small scabs or blotches on leaves and green stems. Cruciferous plants, especially with us horse-raddish and cabbage, are commonly thickly spotted by the parasite. The weeds known as purselane (pusly) and pig-weed or red-root (*Amarantus retroflexus*) are similarly "scabbed," and even the ubiquitous rag-weed (*Ambrosia artemisiæfolia*) does not escape.

Returning to the characteristics of the family, we must notice the striking peculiarity, so far as fungi are concerned, of the production of

Zoospores. The spores of all other fungi, upon germination, throw out one or more threads, which directly or indirectly reproduce the plant, but, though the same thing often occurs here, the more common thing is the division of the spore into five or six portions, which become free by the rupture of the spore coat. On each part two very fine hair-like appendages are produced, which become locomotive organs, propelling the little body for some minutes or hours through the drop of water in which they originate, with astonishing rapidity, as seen under the microscope. Having had their "run," they settle down and germinate like an ordinary spore. The term zoöspore has been given on account of these motions, which were supposed, at one time, to be peculiar to animals. Besides multiplying greatly the germinating bodies, the zoöspores doubtless aid greatly in the dissemination of the species. Another and more proper form of fruit is produced, not, however, so strictly confined to this group, the so-called Oöspore. This arises from a process of fertilization, analagous to that brought about by pollen in flowering plants. The oöspore is the winter spore, the others probably perishing during that season. In the spring it, too, splits up into zoöspores, which appear in every way similar to those spoken of above. Much interest has lately been taken in the finding of the oöspores in the potato fungus, by G. Worthington Smith, of England. Its existence had not before been certainly known as such, though really it had been observed several times and named as belonging to another species. But the great loss caused by this fungus, and the hopes of finding some remedy, set many sharp eyes to investigating its development. We wonder now that Mr. Smith's discovery was not made long before. The fact is now, however, known that this parasite, causing the rot of potatoes, is preserved during winter in the old stems or vines and in diseased tubes. Mr. Smith has followed up his discovery by making some compound of sulphur, potash, etc., which is to be tried on a large scale in England, by application to the seed tubers, the vines of course being carefully burned. In the moist climate of England this disease is much worse than with us, which is bad enough. The remedy, if indeed it proves such, will be a blessing little short of that of the potato itself. As far as observed by myself, the tomato was more injured last season than the potato; the leaves were sometimes white with the fungus and the fruit decayed badly.

The Lettuce mould was quite fully described in the report of the Society last year, and is therefore omitted here, except to say that its ravages were not so bad as the year previous.

Peronospora viticola was very destructive on grapes during the two last summers. The smooth-leafed varieties, especially, were greatly injured. The leaves and young stems first exhibited a whitened, mildewed appearance; these died and were replaced by others, which were killed before the leaves attained more than half their normal size. The fruit did not seem to be directly attacked, in most cases, but perished with the repeated destruction of the leaves. The growth gradually became weaker, the struggling shoots smaller and more starved, and in many cases the first

hard freeze finished what had been so nearly done before—the killing of the vine. Others appeared as merely checked, without being seriously injured. Upon the diseased parts myriads of spores are produced, each of which gives rise to several zoöspores, and each of the latter, under favorable circumstances, reproduces the parasite. But they are of very short life, hence the vast majority of them perish without continuing their kind. Oöspores are found imbedded in the tissues of the leaves and young stems, and in these situations they doubtless survive the winter, to perpetuate the destructive work another year. It must be distinctly understood that this disease is different from the European mildew of the grape, so similar in appearance to the unaided eye, and so effectively beaten by sulphur. This latter, or something very near it, is known in our country, and as readily yields to the sulphur remedy as in Europe; but the destruction caused to American vines by this is very slight indeed compared with the Peronospora difficulty. Sulphur, if not actually useless with it, has but very little effect. In the last year's report a mistake was made as to the fungus which kills the Clinton vines, but that was simply by way of illustration, when speaking of the Lettuce mould. Here, again, the simplest and most effective method of procedure, it seems to me, by way of preventive, is to burn the diseased parts. As fast as the mildew shows itself, cut away the portion and commit it to the flames, not neglecting the old leaves which fall to the ground. To be effective, however, this would have to be generally done in the vicinity, especially in the same vineyard, and would necessitate thorough work.

Cultivated cherries suffered all summer from a mildew-like fungus belonging to the genus *Podosphæria*, and may be species *kunzei*, though it differs considerably from specimens of that species in my possession. The May, the Morello and the sweet varieties were all injured, and in the same way. The younger leaves were most affected, so that the outer ends of the branches showed the most disease,.and often became bare, while the leaves below were fresh and healthy. Perhaps the first noticeable thing was the curling and distortion of the leaves. They soon became stiff, so as to break on bending, and were more or less whitened by the mischief-maker. Soon they severed their attachment to the twigs and fell. The mildew of the lilac leaf is not distantly related to this. The first form of spores is found as simple naked spores on the white threads upon the leaf; the second and true spores, eight in number, are included in a transparent sack or case, and it again in a dark-walled spherical receptacle, less in size than the period after this word. From this dot there radiate about twelve curious appendages, but not so complicated as those illustrated in last season's report as belonging to the lilac.

This fungus feeds upon the surface of the leaves, its threads not penetrating the tissues, as in the last mentioned, and can undoubtedly be destroyed by application of sulphur compounds dusted upon them; but no experiments, to my knowledge, have been tried in this direction.

This long account is here terminated, although its length would be much greater if all comprised under the title and examined during the

season should be added, notwithstanding a considerable vacation among other sights, if not more interesting, at the great Centennial. Considerable time was devoted to pear blight, and, it is believed, some progress made towards at least ascertaining the direct *cause* of the malady. The subject is now and will be, opportunity permitting, continued, in the hope of having something definite to say another time.

Horticultural Society of Northern Illinois.

PROCEEDINGS

OF THE

TENTH ANNUAL MEETING

HELD AT

Franklin Grove, Dec. 23, 24, 25, 1877.

REPORTED BY THE SECRETARY,
O. B. GALUSHA,
MORRIS, GRUNDY COUNTY.

OFFICERS FOR 1877.

President,	H. C. GRAVES,	Sandwich.
First Vice-President,	L. K. SCOFIELD,	Freeport.
Second Vice-President,	J. S. ROGERS,	Marengo.
Third Vice-President,	S. G. MINKLER,	Oswego.
Recording Secretary,	O. B. GALUSHA,	Morris.
Corresponding Secretary,	D. WILMOT SCOTT,	Galena.
Treasurer,	L. WOODARD,	Marengo.

STANDING COMMITTEES FOR 1877.

Cultivation of Apple Orchards.—W. T. Wilson, Washington.

Adaptation of Varieties to Soils and Locations.—T. McWhorter, Aledo; D. C. Scofield, Elgin.

Gathering and Keeping Apples.—Dr. L. S. Pennington, Sterling; W. H. Hanson, Franklin Grove.

Marketing Fruits.—H. D. Emery, Chicago; James Crow, Crystal Lake.

Utilizing Fruit.—S. G. Minkler, Oswego; C. R. Powell, Sterling.

Cherries, Culture and Varieties.—S. M. Slade, Elgin.

Culture of Grapes.—W. Larkins, Rock Falls; W. A. Nourse, Moline.

Varieties of Grapes.—D. J. Piper, Foreston.

Strawberries, Culture and Varieties.—O. B. Galusha, Morris; J. S. Seely, Oswego.

Berries, except Strawberries, Varieties and Culture.—L. K. Scofield, Freeport; C. A. Westgate, Peotone.

Plums, Culture and Varieties.—D. W. Scott, Galena.

Pears, Culture and Varieties.—D. F. Kinney, Rock Island.

Insect Enemies of the Orchard.—D. B. Wier, Lacon.

Timber Planting for Economic Uses.—A. Bryant, Sr., Princeton.

Shelter Belts.—Samuel Edwards, Mendota.

Culture of Evergreens.—Robert Douglas, Waukegan; Arthur Bryant, Jr., Princeton.

Vegetable Gardening—E. C. Hatheway, Ottawa.

Green-House Plants.—Richard Reese, Aurora; J. C. Cochrane, Blue Island.

House Plants.—Mrs. Annie F. Doolittle, of Hinsdale, Ill.

Bulbous Plants.—J. C. Vaughan, Chicago.

Roses.—Lewis Ellsworth; Naperville.

Flower Garden.—Dr. J. E. Ennis, Clinton, Iowa; H. W. Williams, Batavia.

History and Progress of Horticulture in Northern Illinois.—J. Perriam, Chicago.

The Society commenced its Tenth Annual Meeting, pursuant to the call of the President, in the Masonic Hall, at Franklin Grove, Dec. 23d, at 10 o'clock, A. M.

The hall was the most pleasant and comfortable one in which the Society has ever met; nicely carpeted, and beautifully decorated with evergreens—the work of Mr. A. R. Whitney, to whom the Society is indebted for many courtesies and favors during the meeting.

President L. K. Scofield (of Freeport) called the meeting to order, and at his request Mr. S. G. Minkler made the opening prayer.

ADDRESS OF WELCOME.

Mr. H. A. Black welcomed the Society in the following words:

Members of the Horticultural Society of Northern Illinois:

In behalf of the citizens of Franklin Grove, I extend to you a most cordial and hearty welcome.

We point with pride to the result of the labor of our early pioneers in horticulture. Under their persevering labor and guidance our wild, barren prairies have been made to bloom and bear fruit, and present to the eye of the beholder a beauty which no country can surpass.

From the early experience of our agriculturists fruit raising in Northern Illinois was pronounced a failure, and we were frequently informed that the proceeds from a few acres of wheat would purchase more fruit than could be raised on the same amount of land, but by your persevering efforts in selecting and systemizing in this enterprise, it has developed into a fine fruit region. And who shall say that the next decade will not develop Northern Illinois into a fruit region second to none.

Gentlemen, allow me to suggest that one of the important questions for your earnest consideration is: The Shipping and Transporting of Fruit.

Thousands of bushels of apples, the past year, were allowed to go to waste, while there was a demand for them but a short distance away. Some means should be devised to save and utilize this fruit.

Again I extend to you a most hearty welcome.

RESPONSE BY THE PRESIDENT.

SIR: Permit me, in behalf of the members of this Society, to return to you their sincere thanks for this hearty welcome.

We have met with you here that we might once more enjoy the pleasure of meeting our old friends, the pioneers and veterans in horticulture in your midst, as well as to stimulate and promote a more general interest among your people in our heaven-born pursuit. Your Whitneys are our fathers, and brothers, in this ennobling work. We honor the names of our venerable ancestors, and their names shall live and be recorded in our annals for generations to come.

We know that our sojourn here will be a pleasant and profitable one to us, and trust it will be no less so to you.

Again allow me to thank you for your kind and welcome reception, and generous hospitality so freely offered.

The PRESIDENT then addressed the Society as follows:

MY BROTHERS: We feel to rejoice that we meet here to-day under so favorable auspices. The first decade of our existence is about passed. This is the tenth annual meeting of our Society, which has made a truly enviable success, of which we may well be proud; and I sincerely hope and trust that when our second decade shall be numbered in our annals, the name of the Northern Illinois Horticultural Society will stand second to none in its benefits to the masses of the people.

We have had many difficulties to surmount, which, thanks to your energy and perseverance, have only tended to strengthen us in our good work. Many of our old friends we were wont to meet, year after year, at these reunions, we observe are dropping away, and others are occupying their places. Their memories are cherished and held sacred in our hearts.

I trust that all your discussions will be harmonious, and that when our deliberations close we may, one and all, feel that it has been good for us to be here, and that our efforts and labors have been amply rewarded.

COMMITTEE ON LOCATION.

MR. COCHRAN.—*Mr. President:* We are often invited by different members of the Society to meet at their several villages; and, as these invitations are usually given late in the session, the decision upon them is so hurried that we sometimes decide upon a place where, as we afterward find, the accommodations are insufficient. I move, therefore, that the President appoint a committee of three members to receive and consider proposals, and locate the next annual meeting of this Society.

MR. MINKLER supported the motion, which was put to vote and *carried.* Messrs. Cochran, Scott and Minkler were named by the President as such committee.

THE PRESIDENT also announced as Committee on Programme, Messrs. Barler, Galusha and Whitney. This committee reported, from time to time, during the Convention, programmes of work for each subsequent session.

MR. SCOTT suggested that, inasmuch as the fruit lists had not been revised for several years, a general revision should be made at this meeting.

On motion of MR. SCOTT, the meeting then adjourned until five o'clock in the afternoon.

AFTERNOON SESSION—FIRST DAY.

The Society re-assembled at two o'clock, with several additions to its membership. President SCOFIELD delivered his annual address as follows:

PRESIDENT'S ANNUAL ADDRESS.

Another year of busy industry, with all its hopes and fears, its disappointments experienced and anticipations realized, has marked its record on the pages of time and returned the period of our annual reunion, has brought so many of us together once more to interchange our customary greetings and congratulations, and compare our experiences in the various departments of horticultural labor in which we are severally engaged. Although we do not live beneath the sunny skies and amidst the fragrant orange groves of the South, yet I am persuaded that our homes are no less attractive, and our fruits no less acceptable in their season.

Through the untiring industry and perseverance of the early pioneers on our Western prairies, the fact has been fully demonstrated that the hardy fruits may be successfully cultivated in Northern Illinois. Our people are already enjoying the luxuries of rich and lucious fruits the greater part of the year, grown in their own orchards, under their personal supervision.

Many of the small plants may, with little care, be produced in the greatest abundance in every fruit garden. The ordinary attention given to farm crops by the careful, industrious husbandman is all that is required to provide in abundance their rich luxuries during the entire season.

The first centennial year of our national existence has been one as long to be remembered as the one that gave it birth.

Strife and dissentions have aroused and fired our political horizon, partisan spirit has raged to an alarming extent, and the clouds are still ominous; the end is not yet. The promised seed time and harvest, cold and heat, summer and winter, have been continued, and the dry and parched earth, which had became alarmingly so, has been drenched by copious rainfalls, and the seven years' drouth appears at least to have been checked, and new life and vigor have been given to vegetable growth. Our orchards and vineyards, threatened with ruin, have assumed their natural vigor, produced a bountiful harvest, and promise well for the future. Our springs and streams, which had almost ceased to exist, have assumed their original proportions, and the cattle on our broad prairies "lie down in green pastures" and beside the flowing brooklet. Wood land and meadow in rich luxuriance add to the increased beauty of the landscape, and the happiness and contentment of man.

I have observed for several years the increased production of small fruits in the vicinity of our towns and villages, and that the demand keeps pace therewith; that our people are indulging in an increased consumption of these rich, health-producing luxuries, until they are becoming an indispensable article of diet in their season in every well regulated family. Not only the children, but the older people, watch with satisfaction the ripening of the early fruits, and lament when the later ones no longer supply their places on our tables at each returning repast.

In the vicinity of our larger towns and villages the small fruits are being grown in abundance; while among our farmers, with their handsome, well tilled acres, you seldom find a well cultivated fruit garden, and too often only a half cultivated vegetable garden. The little labor required in its season necessary to add so many luxuries and comforts to our tables is deferred. In the spring time farm crops demand first attention, and the labor is all employed to secure, as early as possible, the seeding and planting of corn and wheat, forgetting that the early garden is as essential and important to the comfort and well-being of the family as the more substantial field crops; and, if the garden is made at all, too often the wife and daughter must leave the household duties, or take the few leisure moments they may find, to superintend, if not actually perform, the labor of planting the kitchen garden, and to them is often due the credit of the early vegetables that grace the table in early summer.

A small plat of ground set aside for the growing of small fruits, and the labor of a man a day or two in the season to plant and cultivate, will repay a hundred-fold in the luxuries of the family economy.

It is through the influence of our Horticultural Society that the education of the people must be established, and the lessons we learn from our experiences and experiments will aid them in selecting the methods

to pursue in order to obtain, in the shortest time, at the least expense, and with the greatest economy, the object desired. We realize that our work, beyond the pleasures and luxuries afforded us as individuals, is one of self-sacrifice. We give our time to the cultivation of the orchard and vineyard because it not only affords us pleasure to watch the growth and development of the plant and the ripening of the fruits in their season, but adds much to health-giving luxuries with which to supply our tables, make glad the hearts and rosy the cheeks of the little ones that make merry around our homes.

I will not stop to name varieties or discuss the merits of the various kinds of fruit best adapted to our respective localities, or the best methods of cultivating on the various soils embraced within the limits of this Society. The subject has often been considered in your discussions, and will continue to demand your attention from year to year, that it may be kept before the people in such a manner that even the blind may not stumble.

There are many obstacles continually arising to discourage the horticulturist in his work, and many of our more enterprising and enthusiastic brethren have come far short of realizing their expectations, and we are sorry to say that, after years of anxious, persevering toil, they have been compelled to yield to bitter disappointment of hopes unrealized, and fortunes, apparently within reach, vanish as the vapor before the morning sun.

The army of insects that prey upon the plants and fruit; the frosts of winter that destroy; the blighting storms of spring time; the heat and drouth of summer, are all causes that aid in destroying our golden hopes and blasting the bright future for which we have so long toiled.

Notwithstanding all these discouragements, we have much to be thankful for. Realizing full well that many of our efforts have not been without success—and we believe that in our own district a majority of those devoting their attention to horticultural pursuits are meeting with fairly satisfactory results—and although we have not been considered as occupying the favored fruit district of the State, it must be admitted that we have met with less disappointments than many of our brethren in localities considered more favorable.

This fact is certainly encouraging, and should incite us to renewed efforts, greater energy and zeal in the good work in which we are engaged, believing as we do that all the sacrifice we make in this labor of love will be ten-fold repaid, by the benefits bestowed upon the generations which shall succeed us.

The subject of Forestry has received no little consideration in the discussions of your Society, and the action you have taken on this subject alone has given to us a prominence of which we may well be proud. The importance of this great interest cannot well be over-estimated, as long as a prairie home in the Great West remains destitute of shelter and protection from the fierce storms of winter and scorching sun of summer.

But few realize the comfort that a judiciously planted grove affords to both man and beast; and how easy, and in what a short time, groves

and belts of timber may be grown, not only to adorn but to shield our homes from the furious blasts that often sweep down so suddenly upon us. Our children may enjoy their youthful sports, shielded from the burning sun by the overhanging boughs of the pine, the fir and the spruce. The brute creation will seek the shelter to protect them from the cold and fury of the storm, as well as from the heat of the noonday sun. The birds of the air will build their nests in the boughs, to rear their young, and carol their summer songs around our habitations; and should they pick a few of our early cherries, and luxuriate for awhile upon other choice fruits, the ripening of which we have watched with so much pleasure, we may feel that we are well repaid in granting them this indulgence by the war they wage upon the noxious insects so destructive to orchard and garden.

The birds are our friends—and for them we bespeak protection. Nature's groves are their homes, and when the vandal hand shall have hewn down their habitations, we may invite them to partake of our hospitality, and dwell in our shady bowers, to which they only await our invitation.

We cannot too strongly urge protection to our native groves, which, with a little careful attention, will well repay the labor bestowed, and add a hundred-fold to the attractions and beauty of the scenery.

It would appear to the casual observer that our people were limited in the area of broad acres of land for the cultivation of farm products, and hence the young groves that nature has planted, to beautify and adorn, must be destroyed, to make room for an increased production of corn and wheat.

Our work should be to stay the ruthless hand, to encourage the planting and protection of groves, and to educate the masses, who will only be taught by example.

It has been repeatedly urged by my predecessors, that this Society take some action by which the growth of our native forests may be encouraged and suitable protection afforded to guard against their destruction. Can anything be accomplished in this direction before it be too late? The question is for your consideration, and I would recommend and urge your earnest co-operation with the "*National*" and "*American*" "Forestry Associations," in their efforts in this direction. We cannot give the subject too much attention.

Congress is already aroused to its importance, and has appointed a commission to thoroughly investigate the subject, from whom we may expect a valuable and elaborate report during the present year.

We also recommend that the interest heretofore taken by this Society, in urging the importance, and necessity, of planting and fostering artificial groves, be continued. As it is only by constantly keeping the subject before the people that we may expect to impress upon their minds the benefits to be derived therefrom, and eventually accomplish the object for which we have so assiduously labored.

It has been repeatedly urged that a more systematic method of distributing the Transactions of our Society would result in largely increased

benefits to the people of the State, and accordingly the State Horticultural Board adopted a plan, at the Quincy meeting, Dec., 1875, which has been carried out by their Secretary as far as practicable, in placing the publications in school district libraries, in the various counties in the State; but owing to the limited number published, it has been impossible to meet the demand.

This plan of supplying school district libraries, if it can be carried out, will be effectual in bringing before the great mass of people a work which should be of general interest and a benefit to all, and therefore I trust that the plan adopted may be carried out, as far as the means at the disposal of the Society will warrant.

My friends, how visible are the changes time is making among us. We observe it in the silvered hairs of the venerable fathers of this Society; we see it in the death-roll of its members, as we come together year after year; we see it in the faces of those who gather in to fill the places of the departed. Soon our labors will be closed and the summons issued to go and dwell in the *Garden of the All-wise Creator*, where disappointments come not, and the full fruition of hope shall be realized.

The Committee on Programme reported, as the work of the afternoon, Reports of Committees on Orchard Culture and on Small Fruits, with discussions upon the reports.

The PRESIDENT called for reports upon Orchard Culture, but none were ready.

REPORT OF COMMITTEE ON SMALL FRUITS.

The following, sent by WM. A. NOURSE (of Moline), was read by the Secretary:

Cherries.—Early Richmond, English Morello and late Kentish bore nearly full crops. Black Morello, May Duke and sweet cherries were almost an entire failure—possibly in consequence of rains while the trees were in full bloom.

Raspberries.—A full crop on all sorts. Varieties principally Doolittle, Miami, Mammoth Cluster, Davison's Thornless and Seneca, among long canes; Clark, Philadelphia and Turner among the Antwerps.

A new seedling of long cane raspberry has made its appearance in my vicinity, that will, if it keeps its promise, prove very valuable. It is a bright red, in size larger than Mammoth Cluster—about the size of Brinkle's Orange, and of very fine flavor, nearly or quite equal to the Brinkle's Orange; a remarkably profuse bearer, hanging long on the bushes. It was found in a patch of black-caps, evidently a seedling from them, and perhaps the golden-caps near by. I shall watch its future development with interest, and hope to be able to report that it is the variety we need. At all events, in my opinion, it is a long way in advance of the Ganargua for this section.

A friend of mine reports a black-cap seedling on his ground that he thinks excels all black-caps for sweetness and profuse bearing.

Blackberries.—Generally full crops. There are but few plants growing in this locality, as planters had become disgusted and rooted them out of their grounds. Kittatinny is the variety generally planted now.

Currants.—Fair crops, where cultivated at all. It is noticeable that currants in grass quit the bearing business almost entirely.

The borer still continues his ravages, and the fruit culturist has to use the knife freely and cut out the old wood. By its proper use he gets fruit, and it now brings fair prices.

Gooseberries.—Productive, but slow sale.

Strawberries.—A good yield. There are comparatively few plantations, on account of former failures from dry weather in former seasons, together with the works of white grub or cut-worm, or both. They have destroyed some of the largest plantations for the past two years. The varieties mostly grown are Wilson's Albany, Green Prolific and Downer's Prolific. Monarch and Prouty's Seedling are only recently introduced.

We had rain enough through the entire season to answer all reasonable demands, and at times a little less would have been more satisfactory.

Grapes bore a good crop, and brought moderate prices, so as to be used freely by all. Concords, mostly.

DISCUSSION UPON THE REPORT.

RASPBERRIES.

Mr. Powell had cultivated raspberries many years; he plants in rows seven feet apart, setting the plants four feet apart in the rows, cultivating with a cultivator rather than a corn plow, as this would give too deep culture and injure the roots. He is careful not to plow from the plants, but gives as level cultivation as may be. He clips the canes early in summer at three feet from the ground, and gives one subsequent clipping when considerable additional growth has been made, and at this clipping shortens in the lateral shoots, after which he lets them grow as they will. The varieties which he has in cultivation are Davison's Thornless, Doolittle and McCormick (or Mammoth Cluster). He classes them in the order of productiveness: Doolittle, first; McCormick, second; and Davison's Thornless, third.

CHERRIES.

Mr. Slade—I have spoken of the early Richmond cherry as not having produced more than half a crop for me the past year. Upon one hundred English Morello trees, grafted seven years ago, there was not a quart of cherries; but I still think highly of this variety. It has done well in the past, and I am confident will do so in the future. The *Hipp* (local name), a late cherry, bore a good crop this last year.

MR. LUKINS—I have a few Early Richmonds and English Morellos, on Mahaleb stock, growing upon a sand hill, which bore last summer for the first time, and the English Morellos bore three times as much as the Early Richmonds. I think that variety does best on poor land.

MR. SLADE has had English Morellos do exceedingly well on prairie, even better than on the timber soil where he now lives, which is not as rich as the prairie soil. Half of his trees were grafted upon Mahaleb and half on Morello stocks; those on Morello have already borne heavy crops, but those on Mahaleb none as yet. They are all seven years' growth from the graft. In answer to questions, he said he had seven hundred trees, and had not been much troubled by the birds.

MR. WOODARD said that both these varieties, worked upon Morello stocks, had done exceedingly well in the eastern part of the State, within four or five miles of Lake Michigan. On his place, Early Richmond had produced well on both kinds of stocks.

THE PRESIDENT inquired if any of the members had used the Mazzard cherry as a stock for either of these varieties.

MR. WOODARD replied that many years ago he had used stocks of Mazzard, but they had gradually died out, and he would not recommend them, as they were not hardy enough for this climate.

MR. SCOTT grafted in 1858 on both Mazzard and Mahaleb stocks; the Mazzard stocks overgrew the graft and gradually failed, until they were all dead. The trees on the Mahaleb flourished and are still good.

MR. LUKINS said that fourteen years ago he bought a lot of Early Richmond trees from Mr. Phenix, which were grafted upon Mazzard stocks, near the ground, which he saved, and made valuable by raising a mound of earth about the trunks, so as to bury the whole of the stock. In the same year he bought trees from Mr. Ellsworth, worked upon Mahaleb stocks. These had been the most valuable.

MR. WOODARD stated that Mr. Dunning, near Chicago, who is an extensive grower of Early Richmond cherries, had such excellent success in the use of Morello stocks that trees on any other stock were not wanted in that region.

MR. LUKINS—I grafted a few trees on Morello stocks, but they have borne no more fruit per acre than those on Mahaleb when six years old.

D. C. SCOFIELD—The nature of the soil has much to do with the profits of growing cherries. I planted six hundred trees on prairie soil, in close proximity to my groves, which bore only a partial crop; and

the birds which harbored in the groves ate all the fruit. A neighbor's trees on gravelly soil bear profusely, and the birds do not seriously molest them. It is important to state the kind of soil when giving experiences in fruit-growing, as much depends upon the nature of the soil.

MR. SLADE—I have supposed that if anything was settled it is the fact that Early Richmond cherry trees will bear on all kinds of soil where the trees will grow. So also with Wilson's Albany strawberry.

At the meeting of this Society at Dixon, several years since, I spoke favorably of a sweet cherry that I have; the tree is like May Duke. Mr. Woodard says it is May Duke; but the fruit is sweeter, and is different from May Duke; too sweet, in fact, for the general market. The tree bears as well, on other grounds than mine, as the Early Richmond.

I have another sweet cherry tree which is an immense grower, and has not been hurt by the winters. It came from Connecticut as the "Pine-apple" cherry; the fruit is very large, white, with a blush on one side, and has a slight pine-apple flavor.

MR. PIPER—There is a heart cherry in my neighborhood, brought from Germany, which is very hardy; the tree is an upright grower; the fruit grows in clusters, and is a little smaller than Early Richmond, and nearly black when ripe.

RASPBERRIES.

MR. PIPER wished to speak a word about raspberries. He has planted them in rows five feet apart, with the plants two and a half to three feet in the row; he trims to form of a cone, cultivates with horse between the rows and hoes between the plants. He spoke highly of the Golden Thornless (from Purdy) for canning, as it does not fall to pieces in the cooking as do other varieties.

MR. SLADE—The Golden Thornless bears well and looks well, but is not of good quality. My family do not want it.

MR. PIPER remarked that the fruit is more tart when canned than when eaten fresh from the bushes.

MR. ALBERT DUNLAP—One plantation of Doolittle raspberries, in Champaign, which was highly manured, produced more than any other in that region.

MR. SCOTT—I have raised various sorts, and have fallen back on the Philadelphia as the most valuable, all things considered. But the worms or birds, no matter which, take our fruits; the birds devour my raspber-

ries. I want some *practical* information about birds.* Our essays and discussions about them are of too general a character. We want to know definitely of their habits.

There was no response to this request.

MR. PIPER—A gentleman of my acquaintance grows large crops of Purple Cane raspberries by manuring very highly.

MR. POWELL—I planted raspberries in my orchard seven years ago, when the trees were planted; have cultivated the ground well and they are still good and productive. I think they have withstood the cold winters better that those outside the orchard. I would not set them in an old orchard, but with young trees. My soil is a rich loam, two feet deep; then one foot of lighter loam, beneath which is clay. I trim so as to bring the fruit to the outside of the plants. I have not manured my raspberries.

THE PRESIDENT—I have cultivated raspberries considerably, and agree with those members who have spoken favorably of manuring liberally. I have put three or four inches of manure upon Purple Canes with a decided advantage. Doolittle planted on rich ground does first-rate. Mammoth Cluster succeeds well on rich ground, but I don't consider it as valuable as Doolittle.

MR. GALUSHA spoke of the "winter-killing," so called, of his black-caps and Philadelphias, this and previous winters, and was confident it was solely due to the ravages of a mite which sucks the juices from the leaves, and thus prevents the canes from ripening. He said that you will notice, about the time of the ripening of the fruit, that the older (lower) leaves of the young canes begin to turn pale and soon drop off, and that this work continues until there are but few leaves left, and these near the tip of the cane. This insect, so small as not to be noticed with the naked eye, seems to prefer the matured leaves, as the young and succulent ones are not disturbed. This insect is very common now, there being few, if any, plantations entirely free from it. He trusted that this, like most other insect foes, would soon have had its day, and that we may grow fine crops again. The Davison's Thornless was the most affected in this way, on his grounds, being almost entirely destroyed; next were the other black-caps, then the Philadelphia. The Turner had been thus far exempt from damage, and bore last season an average of one hundred and twenty-eight quarts per row of twenty-five rods long. This, although not more than

* See vol. ii., page 23, of Transactions.—SEC.

two-thirds as much as Philadelphia will do, when unmolested, is yet a good crop, especially when we take into account that the berry is so fine, so beautiful and rich, far surpassing any other which he cultivates, except perhaps the Purple Cane, which is too small for a market fruit. His Turners are now sound to the tip, although the mercury has been about twenty degrees below zero, while all the other varieties are dead. He thinks the Turner the best berry to cultivate, for family use at least, that he has ever tried.

BLACKBERRIES.

Mr. Scott wished to have some action taken in reference to the Blackberry list. He said:

"*Mr. President:* Inasmuch as the Kittatinny and Missouri Mammoth are on our list of recommended fruits, I move that this Society recommend no blackberry, of which we have any knowledge, for general cultivation."

The President—I get fair crops of the Kittatinny, grown among trees. Ancient Briton gives a prolific crop; I have only a few plants of this variety, but they are very productive. The fruit is not large, but as sweet as Lawton or Kittatinny.

Mr. Albert Dunlap said that, in his opinion, the Snyder will prove valuable for Northern Illinois.

Mr. Slade had been growing blackberries for twelve years; his first experience being with the Kittatinny and Wilson's Early. But the only varieties giving satisfaction were native seedlings and Ancient Briton. The best seedling was a wild plant taken up at Buffalo Grove, Illinois; it gives more fruit than all the others and is entirely hardy. The Ancient Briton gave as good a crop the past season as any other. He also spoke favorably of another seedling which he was cultivating.

Mr. Scott renewed his motion, which, after some discussion, was put and *lost*.

STRAWBERRIES.

Mr. Powell called for a discussion on Strawberries, which was followed by a few moments of silence.

The President (jokingly) — Probably few of us know what the strawberry is. I take pleasure in growing this fruit, and eating it, too. I make a plantation each year, and get two crops from each planting. Wilson's Albany is the stand-by, but I am trying other varieties, though, thus far, none has been as profitable as this. People will buy and eat

fruit when it is plenty in the market, and not too dear. I once planted largely of raspberries, and raised one hundred bushels, which it was thought would stock our market. I sold first at fifteen cents, and later in the season at ten cents, and could sell all I could raise. My neighbors have since planted, and the demand still increases. Red varieties sell at fifteen to twenty cents and blackcaps at ten cents per quart.

Mr. Slade—I have raised three tons of grapes in a season, and some of my neighbors five tons, and yet we have not fully supplied the town of Elgin. Of strawberries, I have planted Seneca Chief, Col. Cheney and Michigan Seedling, all of which do as well, if not better, than the Wilson.

I once put a heavy coat of ashes upon a quarter of an acre of Wilson's, which produced a wonderful growth of vines, but they bore little fruit. In answer to the question whether he regarded ashes as detrimental to the strawberry crop, he replied, he did not, but thought them beneficial when used in moderation; he applied too much.

Mr. Piper said that he once had an acre of strawberries on ground with a southern exposure and had but little fruit, while another plantation with a northern inclination bore a good crop. He has tried a large number of varieties, including Jucunda, Agriculturist, which bore a few berries; Green Prolific, a large, fine berry; and Burr's New Pine, which did splendidly, but is too tender; but he had fallen back on Wilson's Albany.

He recommends a northeastern exposure, lets his vines cover the ground, and renews by plowing up in strips alternately; yet he thinks a better practice is to plant once in two years.

The President said, he has always had good crops by frequent planting.

Mr. Galusha said that where land was plenty or cheap, good, profitable crops may be raised for quite a number of consecutive years by alternating in strips—plowing up strips once in two years, say two feet wide, leaving two feet between the furrows, leveling down the furrows with a small one-horse harrow, and allowing the runners to take possession of the newly plowed strips; then, in two years, plow under the older vines, and so on, giving light top dressings in winter, when needed.

Mr. Scott moved that the President appoint committees of three each on the following fruit lists, viz.:

One Committee on Apples and Pears.
do. do. on Cherries and Plums.
do. do. on Grapes.
do. do. on other Small Fruits.

The motion prevailed, and the President said he would announce the committees this evening.

MISTAKES IN HORTICULTURE.

Mr. Minkler moved that we tell some of our mistakes in horticulture, as people often learn as much from the mistakes and failures of others as from their successes.

Mr. Barler moved to amend: that each one tell, briefly, only one mistake.

Both amendment and motion were agreed to, and the confessions were opened by

Mr. Minkler, who said that one of his many mistakes, and one which he thought had been quite common, was in planting too many varieties of apples. Too many autumn apples glut the market and reduce the price, and it is hard to bring up the price afterwards to a just standard. He had fifty sorts, but if he were to plant orchards as extensive as those of Mr. Wier he would plant but twenty kinds.

Mr. Slade confessed to having planted, twenty years since, five hundred pear trees, three-quarters of which were dwarfs, which had given him but little fruit, and half of them are dead. The standards have done better. This mistake was in planting dwarf pear trees at all.

Mr. Barler—My mistake was in trying "to make two blades of grass grow where one grew before;" or, rather, by growing two trees in the space which one should occupy—too close planting.

Mr. Piper—One of my early mistakes was in planting dwarf pear trees by digging great holes and filling them nearly to the surface with stones, etc. My trees nearly all froze out the second winter. I have since succeeded well with dwarf pears, by mounding them up with red clay.

D. C. Scofield—My error was in not planting my apple orchard on the right kind of soil; mine was rich prairie soil; my neighbor, on timber land, had five hundred per cent. more fruit than I did.

Mr. Scott—My first sad experience in horticulture was with sweet cherries, in cutting away the soil where the trees were to stand and filling in gravel. My *mistake* was in planting sweet cherries at all. I had large trees but no fruit.

Mr. Piper confessed to the same error—planting sweet cherries on Mazzard stocks; all are now dead.

Mr. Cochran said he wanted to confess too. Eight years ago he was induced to plant out a large lot of Miner plums, but had failed to find any fruit upon them yet.

The President (jokingly)—My mistake was in not planting enough Miner plums, in nursery—*to sell.* [Laughter.]

Mr. Galusha said his first mistake was, after the winter of 1855–56, in giving credence to the error that all nursery trees which were discolored were necessarily ruined. He had watched trees which were discolored in nursery in that most disastrous of all our hard winters, and knew it to be true that trees left to stand until a good growth of new wood had covered the discolored centers, before planting, are good, healthy trees to-day, and bid fair to bear fruit for many years to come. He thought that fifteen to twenty years of healthy growth and prolific fruitage ought to be sufficient to squelch the humbug.

This sentiment was sanctioned by Mr. Cochran, Mr. Woodard and others.

Mr. Woodard said one of his mistakes was in planting the Northern Spy apple.

On motion of Mr. Cochran, the meeting adjourned to seven o'clock this evening.

EVENING SESSION—FIRST DAY.

The Society was invited to seats at seven o'clock, by the President, who introduced to the ladies and citizens who had assembled Mr. J. W. Cochran, of Blue Island, who addressed the meeting on that interesting class of plants, the Orchids. He had on exhibition two of these beautiful and delightfully fragrant plants, in full bloom, which had been for a long time, and still were, adhering firmly to bits of board as supports. The curiosity in the plants, and the interest in the pleasing and instructive talk of the speaker, were intense to the close of his remarks.

At the close of Mr. Cochran's remarks, Mr. O. L. Barler, by request of the President, entertained the audience for a few minutes with a paper on "Hobby-Horses and Their Riders."

REPORT ON ORNITHOLOGY.

Prof. Cyrus Thomas, State Entomologist, had prepared a paper, at the request of the President, upon Birds, and not being able to be present had forwarded it to the Secretary, who read as follows:

I have been solicited to prepare a paper on Ornithology for the present meeting.

Unfortunately, I cannot claim to be an ornithologist, unless a love for birds, and a firm belief in their great usefulness in destroying the insect pests of the orchard, garden and farm, entitle one to this name; a definition which I trust would equally entitle the majority of your members to the name.

Although disclaiming any right to the title in a scientific sense, I have concluded to comply with the wishes of friend Schofield, especially as this request enables me, without seeming obtrusiveness, to press upon your Society the consideration of a measure now pending before the Legislature, which is designed to test the "Bird question" *practically*, and in a manner which will be more satisfactory to the large body of our farmers and horticulturists than all the theories and scientific conclusions which can be presented.

Although having a single, specific measure to bring before you for consideration, which calls for action rather than talking or theorizing, and although satisfied your members are more than ordinarily well posted on this subject and are ready to decide at once upon this measure, yet I feel it due to you to give some reasons for the action desired. In order to avoid going over the entire broad field embraced by the bird question, and to prevent the repetition of arguments and facts already presented to your Society and to the State Horticultural Society in the various essays and papers read, I have hastily glanced over these as found in the Transactions of the latter Society since 1866. Another object I had in view, in this examination, was to ascertain, as near as possible, the views entertained on this subject by the members of these Societies. This examination has convinced me that the general feeling among the members is in favor of protecting the birds; the grape, cherry and strawberry growers appear, as a rule, to be less friendly towards the feathered denizens of our groves than those who do not make the growth of these fruits a specialty. But even these appear to carry their opposition no farther than enlarging the list of those they would devote to destruction. Some members object to certain species, and others to certain other species, according to their several experiences. There are others, again, who express doubt in reference to the supposed utility of birds as destroyers of injurious insects, as they believe the birds, and even domestic fowls, destroy as many carnivorous as obnoxious insects, thus offsetting their benefits by the injury they do in destroying our insect friends. But, notwithstanding these somewhat conflicting views among our horticulturists, I believe I am warranted in concluding, as before stated, that the general feeling among the members of the Horticultural Society of Northern Illinois is in favor of protecting the majority of birds, at least those *known to be insectivorous;* and I may add, that it is generally believed by them that the birds of this class at least are beneficial to horticulturists.

But the qualification, "*known to be insectivorous*," in the sense in which it is evidently used in this connection, involves an immense amount of research and examination. Investigations on this point have but

recently been undertaken in this country, and the results so far are too meagre to form a fixed basis of action. Prof. Forbes, of our State, is at work on this matter, and will doubtless soon furnish our horticulturists much valuable information; he has already given a very valuable installment of facts ascertained. Let us hope that he may receive that encouragement and aid in this important work which will induce him to continue it. Leaving this test in the hands of those more able to apply it than I am, I shall devote the few pages I contribute chiefly to the tests of observation and experiment, as these are more patent and more satisfactory than any others.

But, before attempting a demonstration, it is always proper to agree as to the definition of the chief terms used in the proposition; therefore, in this case, it is proper to have some agreement as to what is meant by the terms "*beneficial*" and "*injurious*," as applied to birds.

Mr. A., who makes growing grapes a specialty, looking at the matter from his standpoint, is willing, perhaps, to decide that all birds that do not trouble the vineyard are beneficial, at least he is firmly of the opinion that all grape-eating birds are worthy only of slaughter.

Mr. B., who delights in his cherries, is perhaps willing to befriend the birds, if you will aid in destroying the cherry-birds, cat-birds, orioles, jays, and a few others. And thus it goes on to the end of the alphabet.

As an illustration, let me quote a few lines from the Transactions of 1868:

"Mr. Huggins read the following extract from a letter of Mr. Minier: 'I have written a few thoughts on the birds. Alas! poor things, when the Alton Horticultural Society gets after them. They will find friends, however, in the State Society—especially Dr. Warder and "The Douglas."'

"'The Douglas, though 'tender and true' to birds, was not present, and Dr. Warder, owing either to having had his grapes eaten the past season, or to the presence of a good many members of that Ornithological K. K. K., the Alton Horticultural Society, did not make so good a fight as he was capable of. * * *

"Mr. Hull—We must distinguish between birds. Our Alton Horticultural Society likes birds as a whole, but dislikes some. There are injurious and useful birds, just as there are injurious and useful insects. And they increase, but the birds do not keep up the balance. The lady-bug as a cannibal is more useful than the birds. I would kill the jay, cat-bird, cherry-bird, oriole, sapsucker and red-headed woodpecker.

"Mr. Wier—I can get along with all except the cat-bird, thrush and jay. I can keep birds off my grapes, but not off my cherries."

And so on through the discussion. But, by turning back to the Transactions of the previous year, we find Mr. Dunlap coming bravely to the rescue, with an experience indicating clearly the value of his feathered friends, and telling the Society that he does not permit any boy with deadly gun to kill or maim *any* of his birds.

Such are the views of this subject as seen from individual standpoints; but when our horticulturists meet together as the representatives

of this great interest in our State, the scope is greatly widened, and individual interests must be massed, and aggregate results must be taken as the leading criteria of future action. If I rightly understand the object in view in forming these societies, holding meetings and discussing topics, it is not simply to hear theories, read essays and discuss propositions, but to elicit facts and experiences, and by comparing and weighing these, reach results which, by being put into practice, may prove beneficial to horticulture, and advance the general welfare and interest of the fruit-growers and gardeners of Illinois.

If, therefore, actual facts and observations should show that, although the five or six birds heretofore named annually destroy on an average $1,000 worth of grapes and cherries in Illinois, but by their destruction the horticulturists lose $10,000, from an increase of insects; what, I ask, must be the verdict of this Society in reference to these birds? Beyond doubt that they should be preserved.

But the welfare of horticulture alone should not form the boundary of your vision in viewing this question; the great agricultural interests of the entire State must be considered, and the ultimate result of any plan, theory or action, upon this great industry as a whole, should be the criterion by which the value thereof is to be determined. This bird question is one which is to be considered not merely with reference to one specialty of horticulture, nor even with reference to horticulture alone, but in view of its general bearing upon agriculture in its broad sense. It is wholly a mistaken idea that it is an individual matter, unless it can be shown that the act of one person in reference thereto has no effect upon his neighbor. It is also a mistaken idea, which is entertained by many, that the owner of the soil has a perfect right to treat as he pleases the birds which fly over it or alight upon it; and it is time the agriculturists of our State attack this problem bravely, and with a determination to settle it on the broad principle of its relation to the public good.

If Mr. A., by killing the birds which injure his grapes, turns loose a host of injurious insects upon his neighbor gardener on the one side, nurseryman on the other, and adjacent farm of another, causing ten-fold the loss to them that he saves to himself, public policy can no more justify it than the raising of Canada thistles by one for a profit, at the expense of all the surrounding farmers. Even admitting that such birds as have been mentioned do not compensate in other respects for the injury they do to the grapes, cherries and strawberries, and that their slaughter will be justified on this account, there is still another point to be considered before the question is fully settled. The usual method of killing is with the shot-gun, and consequently the killing of a dozen obnoxious birds usually frightens away ten times that number of beneficial ones.

But, without further arguing this point, I appeal to this Society to look at this subject in its broad aspect; and, with a faint hope of inducing the members to consider the matter in this light, I now present some reasons and facts bearing upon this general view.

It has been well said by De Tschadi, President Agl. Soc., St. Gall, Switzerland: "Birds are nature's soldiers, and keep in subjection the

inferior animals. If some amongst them constitute an excellent part of the food of man, furnish him with eggs, with useful feathers, or with a good manure, all these services are scarcely worthy of notice when compared with their labors in the destruction of insects. For this special duty the most essential of their organs have been adapted—their sight is piercing, and even the very smallest among them possess the most extraordinary powers of digestion—whilst their great activity and lightness enable them to exercise their calling incessantly, and where most required. The reproductive power of birds and their instinct of migration are also due to the office imposed upon them. When, in the north, the insect world drops into its wintery repose and sleeps under layers of deep snow, then most of the bird tribe fly to the south, there to perform the same duties; whilst those which remain all the year round in one place gather up the larvæ, the eggs, the nests of insects, the few flies or spiders which may be tempted out of their holes by the sun's rays, and the coleoptera which gnaw the barks of trees."

That one of the chief objects for which birds were created is to keep the hosts of insects in check, and thus prevent the too rapid destruction of vegetation, will scarcely be denied by any one. This, then, is, of itself, conclusive evidence that as a *whole, in an undisturbed state of nature*, they are eminently useful for this purpose, and with the other helps provided by nature will, as a rule, succeed in accomplishing this work. So far as man has been able to look upon undisturbed areas, the facts appear to accord with the theory. But as soon as civilized man enters the field, he commences at once to break up the balance of these contending forces, by destroying the one for food and pleasure, and by producing in abundance a small variety of plants which he substitutes for those nature has provided.

Right here comes up the chief question in this great problem, the one, in fact, upon which its solution hinges. It is this: "Will nature, if permitted to work out results in her own way, allow her flora to be thus disturbed, and yet restore the balance between the obnoxious insects and their enemies?"

The quotation already made from your lamented co-laborer. Dr. Hull, indicates that he held the negative of this proposition, an opinion which is entertained by a very large number, not only of agriculturists, but also by many naturalists.

I shall not attempt at present to combat at length this view of the question, nor will I contend even for the truth of a complete affirmative, but will content myself with the presentation of a few suggestions and facts bearing upon it.

Those who hold the negative, as a general rule, maintain that the chief palliative to be found for the evils thus brought upon the agriculturists is the natural increase of predaceous and parasitic insects which will ultimately be brought about by the increase of the insect food upon which they feed; that introduced species, for example, which for a time prove very injurious, will ultimately be followed by their native parasites, or bring to light new ones here which will finally succeed in keeping them in check.

While I willingly admit the increase of parasites and predaceous species, to a certain extent, in proportion to the increase of injurious species, yet I am compelled, from the facts bearing on the subject, to doubt the correctness of the hopeful conclusion. The balance can never be restored so long as that other important factor designed by nature to co-operate in this work—the birds—is left out.

If the predaceous and parasitic insects were the chief, and, as many contend, almost the only agencies worth considering, which kept the obnoxious species in check in a state of nature, it follows that an increase of the latter was succeeded by a corresponding increase of the former, and the rule ought to hold, to a large extent, at least, as good under the new order of things as the old. The cultivation of the soil and harvesting of crops, no doubt, to a certain extent, disturb the relation between the injurious species and their enemies, but this will not account for the great disparity found between the two classes in districts which have long been in cultivation.

But laying aside argument and reasoning, and turning to experience, we obtain an answer to this inquiry, which, it seems to me, ought not to be misunderstood.

Not only does each additional year to our history bring palpably before us the fact that our insect foes are gaining ground upon us, but that, despite the flood of light scientists have been able to throw upon their history and habits, the annual destruction caused by them appears to be increasing even in a greater ratio than the increase of agricultural products. Entomologists have been able to suggest methods of coping with a number of species, and of obtaining partial relief from others; but such species as the "curculio," "codling moth," "chinch bug" and "migratory locust" still remain masters of the field. If we turn to the old world, to such countries as France, England, Germany, Austria, etc., where cultivation has been going on from time immemorial, and where the science of entomology has reached its highest point of perfection, the case is still worse, and has been growing decidedly worse within the last half century, thus showing, beyond contradiction, that the restoration of the balance by the natural increase of predaceous and parasitic insects is a vain hope not likely to be fulfilled.

Have observing scientists of those countries groped in the dark during all this time, searching in vain for a remedy? By no means. Again and again have they pointed to the remedy; again and again have they sounded the warning, but they have generally been powerless to enforce it. Voices have been heard all over Europe, pleading for the birds, and foretelling the result of their wholesale slaughter, which has been going on of recent years; but the infatuated devotees of fashion, appetite and sport have succeeded, as they are doing even in our Prairie State, in overriding all opposition, and the slaughter of the "innocents" has gone on in an increasing ratio.

Frederick the Great, of Prussia, being fond of cherries, one day ordered a general crusade against the sparrow tribe, because some of them were seen pecking at his favorite fruit. A price of six pfennings a brace

was set upon them; consequently, throughout Prussia the war against them was carried on so successfully that at the end of two years not only were the sparrows extinct but also the cherries and most other fruit. The trees were covered with caterpillars and completely stripped of leaves; insects had increased to an alarming extent, for other birds had been frightened away by the measures taken to destroy the sparrows. "The great King," remarks Tschudi, from whose article this anecdote is obtained, "was obliged to confess to himself that he had not the power to alter that which had been ordained by a greater King than he, and that all attempts at violence and wrong were sooner or later avenged. He retracted his decree, and was even obliged, at considerable expense, to import sparrows from afar; for these, being birds of obstinately sedentary habits, would never nave returned of their own accord."

Here is a practical test, on a somewhat extended scale, which furnishes indubitable evidence of the value of birds as insect destroyers. But we have recent evidence on this point on a still more extended scale. The recent demand for the plumage of birds for ornamental purposes, as well as their flesh for the table, has caused an immense slaughter of the small birds in Austria, France, and other parts of Southern Europe, and also in Algiers; and to such an extent is this carried, that it is said in a single *Roccolo* in Lombardy sometimes 15,000 birds are captured in a day. In this way millions are destroyed annually, and as a natural consequence the insects, in the sections these birds visit, have increased so apparently that the authorities have been compelled to interpose and order their protection. Even in Algiers, where, under French rule, agriculture has been extending, the evil effect of this wholesale destruction is said to be so apparent in the increase of noxious insects that efforts are being made to prevent it.

Thus, in every case, where the facts can be ascertained, we find that a general destruction of birds is followed by a marked increase of obnoxious insects; that even those who lay no claim to scientific knowledge have readily connected the cause of the increase of the latter with the destruction of the former.

Tschudi remarked that the Italian mania having penetrated into those cantons without prohibitory laws, the effect was perceptible even on the opposite side of the Alps, in the increase of injurious insects in the fields and woods, evidently from the destruction of the migratory birds which annually visited them from the Italian side.

But we have given, in a recent number of *The Western Farm Journal*, an account of a very interesting experiment in reference to this matter, which is well worth the attention of fruit-growers. The writer states that he has, for the past two years, been experimenting, not only in protecting, but also in feeding the birds; that during the spring and summer of 1875 he fed something over twenty-five bushels of oats, also keeping water in a trough for them to drink. During last summer the amount fed was still larger; no firing of a gun being allowed in the orchard. The birds ate and destroyed some twenty or thirty bushels of apples, also some cherries. The return for this outlay and kindness, as stated by the writer,

was something over 3,000 bushels of apples, without as much as one bushel of wormy ones among them; yet the codling-moth nearly destroyed every apple in some orchards not two miles distant. The writer further states that when a gun was fired in the timber, half a mile distant, the birds would flock to the orchard for protection.

It is true this experiment has been carried on for but two years, yet the results are highly satisfactory, and indicate the importance of giving this matter a fair trial on a more extended scale. Without adding to the list of experiments, I will here call the attention of the Society to a few facts connected with these practical tests, whether on a small scale, as in the case of the Iowa orchardist, or on a large scale, as in the European countries, and not only with reference to the few instances here mentioned, but in others which have been recorded, or which may have come under the observation of members:

1st. In every instance, the indiscriminate slaughter of birds has been followed by an increase of obnoxious insects.

2d. In every instance, although but few cases can be given, where they have received proper protection the results have been satisfactory.

3d. That, with few or no exceptions, those who advocate the destruction of birds have never fairly tested the matter by practical experiment on their own grounds.

4th. That as a rule the satisfactory experiments have been those where protection has been given to *all birds*.

The last fact is one of utmost importance in the solution of this bird problem, and, as I believe, furnishes the answer to the question before alluded to, on which this matter hinges. It indicates the necessity of disturbing nature as little as possible compatible with the proper cultivation of the soil.

The Great King who rules and governs nature, understood thoroughly, when he was preparing this earth for the habitation of man, the laws and forces best adapted to his well-being, and so ordained it, that when man made his advent into a new territory the larger herbivorous animals, and the carnivora which preyed upon them, should flee before him; but the birds, if allowed to, were destined to remain with him, to regale him with their cheerful notes, please his eye with their gaudy plumage, and faithfully serve him in destroying his insect foes.

The balances and counter-balances between themselves, by the proper proportioning of rapacious, insectivorous and herbivorous species, were all properly made, and should, as I believe, be disturbed as little as possible. The increase of certain insects will bring about not only an increase of the rapacious and parasitic insects which feed upon them, but also increase of those birds which prefer them as food, and close in the wake will follow a corresponding increase of those birds of prey appointed to keep these in check.

With this view, then, as I believe, should experiments be made, destroying none until a fair and thorough trial indicates the necessity of eliminating certain species; or, in other words, to draw an illustration from the politics of the day, not that we should *count in none* except those

we can agree upon, but that none should be *counted out* except those which, after thorough investigation and fair trial, prove to be unworthy, and receive a general verdict of condemnation.

But how are we to try the experiment on a sufficient scale to give satisfaction? This is a fair question, and the answer to it is the chief proposition I have to bring before your Society at this time.

Allow the county board or county court of any county, which may desire to do so, to extend our game laws, so far as they relate to birds, over the entire year, leaving no time for a slaughtering period, which is, in fact, but a notification to town and city sports to make ready their shot-guns and hunting outfits by a given time and enter upon a wholesale slaughtering business.

By giving to county authorities this right, fruit-growing districts may be enabled to bring to the rescue sufficient influence to induce these authorities to undertake the experiment, and thereby we shall be able to determine by actual experiment of a few years what will require the close study of scientists for years to come to determine.

With this idea in view, I have drawn up a bill amending chapter 61 of the Revised Statutes of 1874, entitled "Game," by adding a section authorizing county courts or county boards, wherever it is desirable to do so, to extend the time prohibiting the killing of birds, even for the entire year, if thought best.

The amendment also provides that the penalties and other provisions of said statute, so far as applicable, are to be in force with reference to such extended time. This will give the authorities of any county, where the people desire it, the right to prohibit the killing of any of the birds included in the provisions of that statute; and if they will then see the law enforced, the provisions are ample to secure observance. I thought it best to ask this, and nothing more, at this time, and as the matter is in the hands of a Senator, who is also a member of the State Horticultural Society, I hope your Society will pass a resolution urging upon the Legislature the passing of said amendment, and send the same to that Senator (Mr. Robison, of Tazewell) to be presented with the bill. I would also suggest that you recommend that the word "*deemed*," in the next to the last line of sec. 3, of said sixty-first chapter, be stricken out, so that the last clause of said section, as amended, will read: "When necessary for the protection of fruits or property."

I am for action in this matter, and as this measure leaves each section at liberty to adopt, or not adopt, active and efficient means for protecting the birds, it will certainly not be unjust to any one. It will afford a means of testing the question; and if we can get the amendment through, then I trust we can persuade a few counties to adopt it, with the understanding that they shall give it at least a five years' trial, as less than this would scarcely be a sufficient test.

I do think the time has come when our farmers and fruit-growers should have the right, if they desire to do so, to say to the city and town sports, idle boys and idle men, who spend their time prowling about the farms and groves, and even the prairies, with shot-guns and dogs, slaugh-

tering birds by the thousands, and frightening off the remainder, that this thing must stop. I think it is time our Legislators should learn and feel that it is of more importance to protect the horticultural and farming interests of our great Prairie State, than to legislate, regardless of this, to gratify the whims of a few sportsmen and idle boys, who could be much more usefully employed than running about the country killing quails and other useful birds. Already a bill has been introduced into the present Legislature, in this sporting interest, to shorten the prohibiting season, and give the shot-gun a better chance to destroy your feathered friends. I sought the author and pleaded with him in your behalf, and protested against it, and I now plead with you to come forward in your own behalf and plead your own cause.

Recurring again for a moment to the importance of the test proposed, allow me to add, that while the examination of the crops of birds is of the utmost importance, it can never be decisive in this question until the examination extends throughout the entire season, in the case of each and every bird. This will require an immense amount of labor, and many years before it can be accomplished. And, moreover, if it is not used with care, it may induce us to give a character to a bird exactly the opposite of what is true. There are certain seasons of the year when insects are scarce, during which time birds which are eminently insectivorous are compelled to resort to vegetable diet; if examined at this time the verdict would be unfavorable. Many species eat largely of the eggs of insects, yet this will seldom be detected by an examination of the crop.

But while we are waiting for scientists to make these examinations, we can, if the amendment mentioned is passed, make an experiment which all may observe and understand. If birds are not allowed to be killed in a certain county, and the insects appear to decrease, while in a neighboring county they are killed, and the insects increase, there is a plain matter of fact evidence which amounts to a demonstration.

It is not a wholly new experiment. The governments of several of the German States have issued ordinances to prevent the indiscriminate slaughter of singing birds; this good example has been set by Hesse, Baden, Wurtemberg and Prussia. In Saxony, a fine is imposed for capturing a nightingale, and a tax on every bird kept in a cage; but this law, imperfect and incomplete as it is, does not exist in the Saxon duchies nor the forests of Thuringia, where, in every village, no inhabitant is without his songster, and some have as many as thirty or forty different sorts. The result already experienced in the latter is, that the songsters are getting scarce and insects numerous. We are also informed that many sensible men of Germany, such as Lenz, of Schrepfenthal; Glozer, of Berlin; Schott de Scottenstein, of Ulm, etc., have zealously employed their talents for the protection of the small birds, and have further advocated attention to their increase.

With all these facts before our horticulturists, it appears somewhat strange to me that there has not been more individual experimenting. It does seem to me that it would be well for some of our large orchardists

not only to prohibit gunning and the destruction of birds on their premises, but also induce them to nest in the orchards by placing nest boxes in the trees. They might even go farther, and introduce the English sparrow, and thus test by experiment its value. When it is possible thus to test this question practically, without any great outlay, it appears to me to be unnecessary to theorize and discuss, year after year, the character of this or that bird.

I have more I should be glad to add on this subject, but I have, perhaps, already said too much, unless it had been better digested and more systematically presented. I will, therefore, close, with the earnest request that you befriend the birds. They will richly repay you for any care you may take for their protection.

CYRUS THOMAS.

BILL FOR A BIRD LAW.

Prof. THOMAS also forwarded the following text for a bill, which was also read; and this, together with the essay, was approved by vote of the Society, and the Secretary instructed to forward the bill to some member or members of the General Assembly, with the request of the Society that the be enacted into a law:

A Bill for an Act to amend Chapter 61 *of the Revised Statutes of* 1861, *entitled "Game."*

Be it enacted by the people of the State of Illinois, represented in the General Assembly:

That chapter sixty-one of the Revised Statutes of 1874, entitled "Game," be amended by the addition of the following section:

SECTION 16. The county court, in counties not adopting township organization, and the board of supervisors in counties adopting township organization, be and the same are hereby authorized, whenever such court or board may deem it expedient to do so, to extend the time during which it shall be unlawful to destroy birds, as set forth in said statute. And the provisions of said statute as to penalties, and in all other respects, so far as applicable, shall apply as fully and completely to any such destruction of birds during such extended time as they now do to such destruction during the time or times as limited in said first section of said statute.

Accompanying the text for a bill was a request from Prof. THOMAS, that the Society indorse the bill by resolutions, if they agree to it, and forward it with such indorsement to some member or members of the General Assembly.

This letter was also read by the Secretary.

Mr. GALUSHA moved that a consideration of the proposition of Prof. THOMAS be made the special order of business for to-morrow at nine o'clock, which was agreed to.

SPECIAL COMMITTEES.

The PRESIDENT announced the following committees:

On Fruits on Exhibition.—Messrs. A. Dunlap, Pennington and Graves.
On Cider and Vinegar.—Messrs. Emery and Scott.
On Obituaries.—Messrs. D. C. Scofield and Lukins.
On President's Address.—Messrs. Barler, Galusha and Whitney.
On Final Resolutions.—Messrs. Cochran and D. C. Scofield.
On Small Fruits.—Messrs. Slade, Powell and Scott.
On Apples and Pears.—Messrs. Minkler, Hausen and Whitney.
On Plums and Cherries.—Messrs. Scott, Graves and Woodard.

The Society adjourned till to-morrow morning at nine o'clock.

SECOND DAY—MORNING SESSION.

The Society met, as per adjournment, at nine o'clock, with the President in the chair, and the session was opened with prayer by Rev. O. L. BARLER.

The Secretary read letters from Mr. WIER and J. H. HARRISON.

ACTION UPON A BIRD LAW.

The special order was taken up, and the Secretary read the letter and text of the bill from Prof. THOMAS respecting the destruction of birds.

The Secretary was requested to draw up a resolution indorsing Prof. THOMAS' plan; which he did, as follows:

Resolved, That this Society heartily indorse the proposition of Prof. CYRUS THOMAS, our State Entomologist, and urge our Senators and Representatives in the State Legislature to enact the bill presented into a law.

Quite an animated discussion ensued upon the reading of the resolution, all the members favoring protection to the birds, and many urging that our Legislature should enact a law which would extend over the entire State; others, and a majority, feared losing the bill entirely if we asked for too much, as the "sporting gentlemen" from the cities and villages would use every means available to secure the privilege of shooting our friends *for sport*.

The resolution was then unanimously adopted, and the Secretary instructed to send a copy of the bill and resolution to such members of the General Assembly as he deemed proper.

MORE MISTAKES.

THE PRESIDENT called for a continuation of the list of mistakes in fruit growing.

MR. HAUSEN—My mistake was in planting too many varieties.*

MR. WOODARD had handled too many Miner plums.

DR. PENNINGTON—It seems to me this relation of unfavorable experiences is a good thing; the recital of mistakes may be profitable; but I cannot now say which, out of a great many, was my worst mistake. I came near losing my orchard by plowing it in June, in one of our dryest seasons, when the soil was hard and baked. As to sending out and planting too great a variety, it was a general mistake in early times, but is being abandoned of late years; the lists of fruits are being contracted.

Dr. P. also spoke of pruning in the apple orchard, and recommended a moderate annual pruning, but not sufficient to produce a growth of suckers or "water sprouts."

MR. BRUBACKER—The great mistake I made in orchard planting, on my soil, was in not planting more freely of Jonathan and Yellow Bellflower, they succeed so well with me.

DR. PENNINGTON—Another of my mistakes was in planting and recommending the Yellow Bellflower, as it is unprofitable with me, even when trees are old.

REPORT ON LIST OF SMALL FRUITS.

The Committee of List of Small Fruits presented the following:

Your committee to recommend a list of small fruits as worthy of cultivation, while convinced that the soil exerts a vast influence on most species and varieties, especially of the strawberry, would present the following as the most generally valuable varieties for Northern Illinois:

Strawberries.—Wilson's Albany, Green Prolific, Boyden's No. 30, Michigan Seedling, Kentucky and Col. Cheney.

Raspberries.—Doolittle, Mammoth Cluster, Davison's Thornless, Philadelphia and Purple Cane.

Blackberries.—Your committee knows of no blackberry which they can be justified in recommending; the older sorts having failed and the newer ones not having been sufficiently tested.

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* Mr. Hausen had fifty-five varieties of winter apples on exhibition at the meeting. See report of Committee on Fruits.—SEC.

Currants.—Red Dutch, White Dutch, Cherry, Victoria, White Grape and Long-bunch Holland.

Gooseberries.—Houghton and American Seedling.

All of which is respectfully submitted.

S. M. SLADE,
C. R. POWELL,
D. W. SCOTT,
} Committee.

ACTION UPON FRUIT LIST.

MR. GALUSHA—*Mr. President:* We find ourselves in a dilemma such as the State Society has often been in, and which induced that Society to abandon the practice of publishing recommended lists of fruits. As was remarked by the chairman of the committee: It is impossible to make up a list of any considerable number of varieties of any species of fruit which will be *best*, or even profitable, for all fruit-growers within even a small area.

The strawberry which, from my present knowledge, I would prefer above all others is not mentioned in the list; this is the Charles Downing, which has been tried over a great extent of territory, and on a great diversity of soils, and has been pronounced *best* everywhere (all things considered), producing even more bountifully than the Wilson; the fruit is fully equal to that sort in size, and much superior to it in flavor—bearing carriage tolerably well. It seems to me that if we are to adopt a list at all, we should discriminate closely, putting only those on the list for general cultivation which have been thoroughly tested and found good on the different soils of the district—and placing other valuable sorts on lists for home use, home market, or for trial.

MR. SLADE—It is impossible to adopt lists of fruits which will be best for a considerable length of time, even upon the same soil. Ten years ago, if I had planted one thousand apple trees, to raise fruit for market, five hundred of them would have been Carolina Red Junes—from former recommendations of the Societies—but now I would plant very few of them.

The members of the committee are not satisfied with their report; but we did our duty according to the best of our knowledge. We do not consider that we can report lists, especially of the small fruits, which will be good over all the district. Five years since I planted three hundred Red and White Dutch currants, and fifty Long-bunch Hollands, and have picked three times as much fruit from these fifty plants as from the

three hundred. The berries are more readily gathered, are larger and hang longer on the bushes—even till frost—and find a more ready market. I regard this variety as worth as much as all the others put together.

THE PRESIDENT called for action upon the several varieties, in the order reported.

STRAWBERRIES.

Wilson's Albany.—Adopted.

Green Prolific.—Adopted for home use and near market (because too soft to ship).

Seth Boyden (Boyden's 30).—Adopted for trial.

Michigan Seedling.—MR. SCOTT moved to adopt for trial.

MR. MINKLER objected to put any fruit upon the list for trial which had not already been tested by five members.

MR. PIPER has had it for three years. It is too soft for market.

MR. SLADE—I have also had it three years, and it does well for me, but may not do as well on the grounds of my next neighbor; it is the most profitable berry for home market that I grow, and customers want the plants.

No action was taken upon the motion to adopt for trial.

Kentucky and *Col. Cheney* were passed over without vote. Several members, however, speaking favorably of them.

Charles Downing found another advocate in MR. BARLER, who said that it was now the leading strawberry about Alton, and was becoming so where it had been tried in other parts of the State.

RASPBERRIES.

The following were adopted for general cultivation: *Doolittle*, *Davison's Thornless*, *Philadelphia*, *Turner* and *Purple Cane*.

BLACKBERRIES.

Ancient Briton and *Snyder* were adopted for trial.

CURRANTS.

Long-bunch Holland, *Red Dutch*, *White Dutch*, *Cherry*, *Victoria* and *White Grape*, were adopted for general cultivation.

GOOSEBERRIES.

American Seedling and *Houghton Seedling* were adopted for general cultivation.

Mr. Piper said he has a few bushes of *Charles Downing* gooseberry, which he values highly; the berry is large, white and not sour.

Mr. Cochran—In a damp season it does not do as well as Houghton.

APPLE LIST—REPORT OF COMMITTEE.

Mr. President: Your Committee on Revision of the Apple and Pear Lists would report the following varieties:

Red Astrachan, Duchess of Oldenburg, Maiden's Blush, Bailey Sweet, Jonathan, Domine, Rome Beauty, White Pippin, Willow Twig, Ben Davis and *Red Romanite*, for spring cider.

Of Siberian Crabs we recommend *Whitney's No. 20, Montreal Beauty, Transcendent* and *Hyslop.*

PEARS.

We also recommend the following list of Pears:

Bartlett, Howell, Tyson, Flemish Beauty, Duchess (on quince) and *Lawrence.*

Respectfully submitted.

S. G. MINKLER,
HENRY HAUSEN,
A. R. WHITNEY,
} Committee.

Mr. Woodard spoke of the *Tetofsky* as the best early apple for him. It yields twice as much as Red Astrachan and is a little earlier. He moved to add it to the list—for trial.

This motion was supported by several members.

Mr. Brubacker had it, top-grafted on Siberian Crabs. It is about the size of Red June, and not equal to it in flavor.

Mr. Woodard said he had two trees top-grafted with it which bore large crops; and that the fruit is nearly as large as Duchess of Oldenburg.

Mr. Richmond has it, and values it. The fruit is light color—like Keswick Codlin.

Mr. Whitney and Mr. Rogers spoke favorably—mentioning that the fruit does not color until fully ripe.

Mr. Scott—We have had the Tetofsky about twenty years, near Galena, and it is gaining in popularity—is hardy—is grown in Texas. The fruit ripens two weeks earlier, at Galena, than any other variety that we have; it does not color until fully ripe, when it becomes striped.

Mr. Woodard's motion adopting the *Tetofsky* for trial prevailed.

Mr. Galusha—I would like to hear about the Fourth of July, about which so much was said in this Society, and in the papers a few years ago. I was induced to procure and plant a couple of the trees, one of which bore last summer. The fruit is a beautiful, smooth apple, yellowish-white ground, striped with wide stripes of red when ripe, ripening soon after Early Harvest and before Carolina June; of a sub-acid flavor, not as good as Carolina June. The tree is a compact, upright grower, with strong shoots; it did not seem to be damaged by the hard winter of two years ago.

Mr. Scott, and several other members, thinks it identical with the Tetofsky, while others insisted that there is a difference in the trees.

Mr. Scott moved to strike off all the pears from the committee's list except Flemish Beauty.

Mr. Slade—If I had planted all Bartletts I would have been richer for it. Flemish Beauty has not done well for me.

Mr. Cochran spoke of a pear orchard belonging to a neighbor of his, in which the trees blighted down nearly to the ground sometimes, yet sprung up again, and had given a good crop; and he had found the same thing occurring in other places in his travels.

Mr. Galusha spoke of a row of dwarf pears which he planted more than twenty years ago, and which had been manured occasionally as blighting, more or less, every few years during the time, but which renewed themselves and bore a crop as often as once in three years, on an average.

Mr. Richmond—For the last ten years Lawrence has proved best with me. Flemish Beauty has been killed with blight, while Lawrence, standing near, has escaped.

Mr. Scott—Flemish Beauty stands best at Galena. A seedling variety, three trees of which are growing there, gives an enormous crop every year of hardy fruit—small, and not best, but which brings a good price. I have grown pears twenty years and found no cultivated variety, except Flemish Beauty, that would endure. Bartlett trees give one crop, and then succumb to blight.

Mr. Scott's motion was put to vote and *lost.*

On motion of Mr. Howell, the list, as reported, was adopted, "for family use."

REPORT ON CHERRIES AND PLUMS.

Your Committee on Cherries and Plums beg leave to make the following report:

For general cultivation we recommend the Early Richmond and Large Red Morello cherries, on their own roots or grafted upon Mahaleb or Morello stocks.

Also, for trial, the Leib cherry.

We recommend no plums for general cultivation; but, for trial, commend the Miner, Weaver and De Sota.

Signed, D. W. SCOTT, H. C. GRAVES, L. WOODARD, } Committee.

Mr. Scott.—The Miner plum seems quite particular in its choice, situation and soil. My orchard, planted in yellow or red soil, five or six feet to lime rock, has not borne; while the orchard of my neighbor, Mr. Hallett, standing on a hill in soil similar to mine, but which is under-laid with blue pipe-clay, is very productive. Three years ago Mr. Hallett bought three hundred Miner trees from me, and last season they bore a full crop.

The Cherry list was adopted; and also the Plum list, with the qualification that the Miner was put for trial only on account of shyness in bearing.

Mr. Richmond spoke favorably of the Wild Goose plum, and moved that it be added for trial, but the motion was not supported.

On motion, the Society took a recess till two o'clock, P. M.

During the recess, the Society, in a body, visited the beautiful grounds, extensive orchards, and cider, cider-wine and vinegar factories of Mr. A. R. Whitney. These are situated about a mile and a half southwest of Franklin, on a finely undulating tract of land, well calculated to display to good effect the groups and avenues of tall evergreens which ornament the landscape. Mr. Whitney has probably the most extensive orchards in Northern Illinois, if not in the entire State — over 20,000 trees being now in bearing. At this time he had about 2,500 barrels of cider, cider-wine and vinegar in store. All the samples tested by the members were pronounced excellent, and many of them very superior.

The benefit of the shelter of evergreens is demonstrated here; for several species are growing among the groups of large evergreens which would perish if planted singly. Mr. W. stated that he had noticed a

difference, at one time, of ten degrees in the thermometer, during the prevalence of a cold west wind, between the east and west sides of a dense white pine screen standing near his cider works.

Two large apple trees, one an American Golden Russet and the other a Maiden's Blush, standing on the north side of a close row of pines, which overtop them and crowd them to the north — being only six feet from them—bear *regularly* every year, while often the same varieties, planted in orchards, fail. Had not our visit been so hurried, no doubt many more interesting and valuable facts could have been noted.

SECOND DAY—AFTERNOON SESSION.

The Society convened, and was called to order by the PRESIDENT at a quarter past two o'clock.

Mr. MINKLER moved that D. W. SCOTT be a committee to send greetings from this Society to the Horticultural Society of Western New York, now in session at Rochester. Carried.

Mr. L. WOODARD (of Marengo), Treasurer of the Society, presented the following:

TREASURER'S REPORT.

L. Woodard, Treasurer, in account with the Horticultural Society of Northern Society.

1877.		Dr.	Cr.
Jan. 27.	To Balance on hand, as per last report.....	$ 35 21	
" 27.	" Received from L. Ellsworth, back dues,	2 00	
" 27.	" Membership fees at winter meeting at Crystal Lake.....	68 00	
" 27.	" Memberships received since, fourteen...	14 00	
Jan. 27.	Paid D. W. Scott, Sec., printing, etc...		$ 23 25
Feb. 1.	" for postage stamps.....		1 00
" 12.	" Expressage on stationery and postage,		1 00
" 25.	" O. B. Galusha for compiling Transactions.....		30 00
" 25.	" C. E. Southworth, on account of engraving in Transactions.....		20 00
1877.			
Jan. 23.	By amount in Treasurer's hand.....		43 96
		$119 21	$119 21

The PRESIDENT appointed Messrs. D. C. Scofield and S. G. Minkler a committee to examine and report upon the Report of the Treasurer.

The PRESIDENT announced as the next business in order, the

ELECTION OF OFFICERS.

The officers were elected with perfect unanimity, there being but one person placed in nomination for any office:

President—H. C. GRAVES, Sandwich.
First Vice-President—L. K. SCOFIELD, Freeport.
Second Vice-President—J. S. ROGERS, Marengo.
Third Vice-President—S. G. MINKLER, Oswego.
Recording Secretary—O. B. GALUSHA, Morris.
Corresponding Secretary—D. W. SCOTT, Galena.
Treasurer—L. WOODARD, Marengo.

REPORT OF COMMITTEE ON GRAPE LIST.

Mr. President: Your Committee, appointed to recommend Varieties of Grapes for Cultivation in Northern Illinois, report, recommending Concord, for general cultivation; Martha, Rogers' No. 15 and 19; also, Salem, or Rogers' No. 53, for trial.

Respectfully submitted,

O. B. GALUSHA,
J. D. PIPER, } Committee.

The following report was presented:

FRUITS ON EXHIBITION.

Your Committee, appointed to report on Fruits on Exhibition, submit the following:

W. H. Hausen, Franklin Grove, exhibits fifty varieties of apples, among which are some promising seedlings.

John P. Brubacker, Nachusa; Grove Wright, Rock Falls; R. B. Sproul, John Wagener, Bradford; Samuel Dysart, Franklin Grove, and C. R. Powell, Sterling, each have creditable displays.

O. B. Galusha, Morris, exhibits an apple seedling named Triumph, that is of fair size, showy and in quality good.

Mr. Hausen's collection of apples is worthy of honorable mention as being one of the finest displays of fruit shown at any of our winter meetings by an individual. It speaks well for Mr. Hausen, and for Lee county. Mr. Hausen also presents a specimen of the Rhenish May, grown in 1875, in a fair state of preservation.

With few exceptions, we find the fruit correctly named, and specimens of fair quality.

L. N. S. PENNINGTON,
ALBERT DUNLAP,
H. C. GRAVES, } Committee.

Several members spoke in praise of Mr. Hausen's collection of fifty varieties, and all admitted that they had never seen such a fine collection in the winter in the State.

The PRESIDENT said, we are in as good a fruit-growing region as there is in the State.

REPORT ON GENERAL HORTICULTURE.

ARTHUR BRYANT, Sr., of Princeton, from the Committee on General Horticulture, presented his report, which was read by the Secretary:

The remarks upon General Horticulture in the following report are intended to apply only to the county of Bureau. The soil, when plowed in spring, was in an exceptionally bad condition, breaking up in hard, compact lumps, which were with difficulty pulverized. Nevertheless, the strawberry crop was fine, owing to frequent rains during its season of growth; but, on account of the destruction of plants in previous seasons, the supply was not abundant. Raspberries were a fair crop, and in good demand. Cherries were abundant, but of rather small size; and, so dull was the market, that a great part of the crop was left to be harvested by birds. Currants were a moderate crop; but gooseberries, without distinction of variety, were almost universally destroyed by mildew. Grapes promised well at the outset, but frequent rains and damp weather, preceding the season of ripening, caused many to rot so that the clusters were generally loose and straggling. This, however, was of little consequence, since the market was so over-stocked that one-half the crop in some vineyards was never gathered. Most of the Delaware vines were affected by the leaf blight, which occasionally attacks that variety, and the fruit consequently did not ripen.

Pear trees bore fruit, but not less than three-fourths of some varieties were so knotty and crabbed as to be entirely worthless. Such were the White Doyenne, Clapp's Favorite, Tyson and Howell.

The apple crop was generally abundant, though some orchards did not produce largely—my own among the rest. Much of the fruit was of inferior quality, many varieties being mostly scabby and shrunken, and a large proportion of nearly all in some way defective. Throughout the season, from the earliest varieties to the latest, apples showed an unusual disposition to drop prematurely; so much so that one-half the crop of winter varieties was on the ground before the usual time of gathering. Another peculiarity of the season was the early fall of the leaves from most of the orchard trees, many being entirely bare of foliage before the fruit was gathered. Many had a sickly appearance through the summer; their foliage was small and thin, and they made little or no growth. Such were generally the Jonathan and Ben Davis.

The inferior character of the apple crop, the damage caused by the codling moth excepted, and the premature dropping of the leaves and fruit, are doubtless to be attributed to the unhealthy condition of the trees, consequent upon the extreme cold and dryness of preceding seasons.

The winter of 1872-3 destroyed or weakened many fruit trees; that of 1874-5 was still more destructive. Unlike the damage done by the destructive winter of 1855-6, which was apparent in the trunks and branches, only the roots appeared to be injured by these dry winters; the entire tree above ground appearing in the spring of 1875 to be entirely unharmed. I have a young orchard of about 500 trees from three to five inches in diameter, some of which were killed by the winter of 1874-5. Last spring I had those that were dead, or seemed to be nearly so, to the number of sixty, grubbed up and replaced. During the past summer at least as many more have gone by the board, and how many others may be irreparably damaged it is impossible to say. My experience of forty years in orchard culture is adverse to the idea that the apple tree is likely, unless in exceptional cases, to be long-lived in this climate.

ARTHUR BRYANT.

On motion of Dr. PRATT, Mr. H. M. THOMPSON was made an honorary member of this Society, and invited to participate in its deliberations.

Mr. O. B. GALUSHA, from the committee, read the following report upon the

UTILIZATION OF FRUITS.

Mr. President: As a member of your Committee on Utilization of Fruits, I report: That I have learned very little that was new to me during the past year, but have observed so much *waste* in fruits, and so much depreciation in market value of fruits and their products, by mismanagement, carelessness, and failure to apply truths taught so often in this and the State Horticultural Society, that I am inclined to devote this paper mainly to the reiteration of these facts, and to exhortation to fruit growers, and fruit consumers also, endeavoring to show the profits of carefulness and learning, and applying the best modes.

It has been repeatedly stated in the meetings of horticultural societies of the State, and published in all horticultural and agricultural journals, that if apples are picked carefully from the tree and transferred immediately to a cool place—being handled during the process as one would handle *eggs*—they will keep twice as long as those which are carelessly handled (even if hand-picked), so that some of the cells of the flesh are ruptured, though no bruise may appear externally; yet I have seen orchardists picking their apples by hand (for this all intelligent fruit-growers regard as essential) and tossing them into a basket, perhaps four or five feet distant, as farmers ordinarily treat their potatoes.

While visiting at the house of a friend, an intelligent orchardist, about a month since (the last of December), I was treated to a dish of beautiful, fresh-flavored Maiden's Blush. Upon inquiring, "How did you keep them so nice till this time?" he replied, "I picked them carefully and carried them immediately to my cellar, and they have not been disturbed since."

This same orchardist keeps Snow apples to March and Jonathans till May. He practices giving his apples a shower bath, laying them three or

four in depth upon an open inclined plane, made of laths or strips, admitting immediate drainage, and dashing *cold* water upon them several times in quick succession, so as to wet and cool the entire surface. This, of course, is done in the shade, and the fruit, when dry, is transferred to the cellar. I am somewhat skeptical as to the utility of the watering process; but as I have eaten delicious Jonathans the last of April, which had been treated in this way, am not entirely incredulous.

The different practices of orchardists for keeping apples in a fresh state for winter or spring use, or for market, have already been given in the reports of the State Horticultural Society. The old practice of placing them upon shelves, only two or three in depth, so they would have plenty of air, still has its advocates, though their number is growing less year by year, as the success of other modes becomes known; and the prevailing practice of our most successful growers now is to *barrel up tightly* in autumn, and keep in a dry, cool place, and as near the freezing point as may be without allowing the fruit to freeze.

Apples kept in barrels through the winter should be repacked immediately before sending to market in spring.

Of the various modes of preparing fruit for the table—although coming within the scope of the topic assigned this committee—it is not profitable to write; and I will confine myself to the modes of conservation preparatory to these.

Drying or Dessicating Fruit.—The introduction, within a few years, of improved machines for rapidly paring, coring and slicing apples, and the many devices for drying fruit, have so far cheapened the process and improved the quality of the product, that this mode of conservation has come to be one most important, especially for those who have a surplus of summer and autumn fruit not marketable at remunerating prices. For extensive operations there are a large number of machines for this purpose—of which the "Alden" is the type—which are well known, and which produce dried fruit of a quality so far superior to that dried in the old way (by spreading in the sun) that it would hardly be recognized as the same species or variety of fruit. There are also many devices, well adapted to the use of the ordinary farmer or professional fruit-grower, in preparing fruit for their own use and for market. All these, I think, operate upon the one principle of moving the fruit—spread in thin slices

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The notion that, before being closely packed or stored, the fruit must be allowed to "go through a sweat," is abandoned, as a fallacy, by many of our most intelligent fruit-growers; and apples intended for winter or spring market are tightly barreled in the orchard, as picked. It is known that apples "sweat" in the same manner and for the same cause that a pitcher of cold water sweats when surrounded by a damp atmosphere warmer than itself; hence, if the damp air is excluded there will be no sweating. The intelligent housewife, who has a cool, dry cellar, knows that apples brought up from it into the damp, warm atmosphere of the kitchen, will soon become covered with moisture, from the condensation of the warm vapors of the room upon their cool, smooth surfaces. This condensation is the *sweating of apples*, so called. Let no one fear the decay of his apples from this cause, unless he confines them closely, thus preventing the evaporation of this moisture while they are thus covered with it.

upon frames or screens—over and through heated air, or, what amounts to the same thing, causing currents of heated air to pass through (above or below) the fruit.

It is obviously not necessary for the farmer to expend a large amount of money in the purchase of these patented machines, as three or four large dry-goods boxes can readily be converted into a good dry-house, and any old (or new) small stove used as a heater, being careful to so arrange the "house," the heater and the escape orifices that a constant current shall be kept up, and that no part of the drying shall fall much below 150° or rise much above 200°; always giving the fruit the highest heat when first introduced. Any man of ordinary skill can make such a dry-house. It is, perhaps, more difficult to secure uniformity in the product in small than in large chambers, yet, with a little experience and the exercise of care, there need be little damage or loss.

Canning Fruit.—Since this mode of preserving fruits has come into use it has steadily increased in popularity, until now no frugal housewife upon the farm is satisfied to enter the cold season of the year with less than from one to two hundred cans of fruits nicely stored in a dark cupboard in the cellar. Even apples are now canned with decided success and advantage. The processes of canning are too well known to require repetition here.

Cider Making.—In making cider carelessness and disregard of cleanliness is the rule; hence, sour, ill-flavored cider is the result, which, however, does not long remain cider, but turns into vinegar, and that not of the best quality. The process of making good cider is so easy and cheap, and has been so often reiterated, that it seems strange that nineteen out of twenty of our orchardists should disregard it.

Make your cider in cool weather, from ripe, sound apples; put it into clean, perfectly sweet barrels and remove at once into a cool cellar, and place the barrels, where they are to remain, giving slight vent; as soon as the first fermentation is over and the cider runs clear, rack off into clean barrels, and your cider will keep without becoming hard and sour. This result will not be obtained if rotten apples are ground up with the sound ones.

If it is desired to preserve the cider fresh and sweet, as it comes from the press, put it into linseed oil barrels, or, if they cannot be procured, pour a little linseed oil in the barrel. This will, of course, remain on the surface, excluding the air, and will not flavor the cider. I have tried various recommended plans for refining and preserving cider, such as putting lime, charcoal, raisins, etc., into the barrels, but have not succeeded in making as good an article as by the above described simple plan. An account of a mode of making superior cider, or apple-wine, is given in the January number of the *American Agriculturist.*

Wine.—I will not attempt to instruct this Society in the art of making wine for commerce, but will say that if any of the members have a surplus of grapes, and want a little wine *for use in sickness*, they can make it in the way described for making cider, adding that it is absolutely necessary that the grapes are *fully ripe*, and that all immature and all decayed grapes must be removed.

In making both cider and wine, the air must be excluded from the casks after the first fermentation has taken place, and the liquor drawn off.

Vinegar.—It is the practice to utilize (?) the rotten and green apples (windfalls) by grinding them up with the sound and ripe windfalls and converting them into vinegar; but this is unwise, inasmuch as the bad fruit effects the flavor and weakens the strength of the vinegar. A good way to utilize such fruit is to feed it to the swine, and let them manufacture into pork whatever of value it contains.

Boiled Cider.—An excellent way to utilize rich, windfall apples is to convert them into cider, and boil down about three and a half to four barrels into one, skimming thoroughly during the process. This will keep well, and by cooking sweet apples in it, till they are quite tender, a superior sauce is made, which also will keep well for use during winter and spring. This is more generally relished than that similar condiment, the famous apple butter, which all fruit-growers' wives know how to make, or can learn from a near neighbor. I have found the cider from the Fulton apple to make the best cider for boiling of any that I have tried. This variety produces an extra quality of cider for any purpose.

It must not, of course, be expected that apples of a weak quality of juice, such as Maiden's Blush, Early Pennock, Willow Twig, etc., will produce as good cider or vinegar as those having a rich juice, as Benoni, Roman Stem, Wagner, Fulton, Wine Sap, Gilpin, Minkler, etc.

In conclusion, I will say that there is little danger of overstocking the market with good fruit, and well prepared products from good fruit. If well grown and intelligently utilized, fruits, in some, if not all, of the various forms mentioned, will continue to bring remunerative prices.

Mr. Minkler cautioned members about buying linseed oil barrels, as many have been previously filled with some substance which would ruin the flavor of the cider.

Mr. Galusha described what is called the Dunlap fruit box—named so for the lamented Hon. M. L. Dunlap, who used and recommended it. It is made of two heads of one-inch pine lumber, each fourteen and a half inches long, by twelve and a half inches wide, with laths dressed and nailed on three sides. The laths are seventeen and a half inches long, making the box fifteen and a half inches long in the clear; holes are cut in the heads for convenience in handling These boxes are distributed in the orchard, and the fruit put directly in them after picking; and as three of them fit nicely in a wagon box, and, since they hold just one bushel, when level full, they can be piled in two or three tiers in the wagons, and used at the same time as measures and packages for transportation. A box one-third longer, holding a bushel and a half, is used for storing in the cellar.

Mr. Albert Dunlap said the cost of the material for making the boxes is about eight cents each. The cost of the one and a half bushel boxes would not exceed ten cents each. He said they value these boxes highly, and could not well do without them.

Mr. Piper stated that he had been using a box a little larger than the Dunlap box. His is fifteen inches wide, ten inches deep and twenty-two inches long, made in the same way.

TIME TO GATHER APPLES.

Mr. Slade—During last autumn I picked half my apples before a hard freeze. I also picked apples in the morning immediately after a hard freeze, and while they were frozen through, but perceived no difference in them. They are still keeping equally well—better than Eastern apples.

Mr. D. C. Scofield said it has been said that our apples would not keep as well as Eastern apples, but they were keeping better thisw inter, especially Northern Spy.

Mr. Minkler—If your apples get frozen upon the tree, do not gather at once, but leave them a few days and they will recover. We are not careful enough in assorting apples for sale, so as to have them all number one. If we adulterate our fruit to put upon the market, it will depreciate the price, and diminish our chances of sales. Let us put up first-class fruit, put our brands upon it, and always keep up to our brands.

Mr. Brubacker—A part of my apples here on exhibition were caught in that sudden freeze, and frozen through, and a part were not frozen, but no one can tell the difference. Fruit should be carefully picked and handled, as carefully as one would handle eggs, if we wish it to keep well.

Mr. Minkler—I handle my apples in this way, and won't allow the dealers to whom I sell to unload them unless they will do the same; it is all-important.

Mr. Hausen—Different sorts must be gathered at different times; but for keeping well all should be gathered before hard frost.

Mr. Woodard—I came from New York State to Illinois in 1851. When in that State I picked my apples early, and left them on the ground to cure, when cured I put them in the cellar; but since coming here I have sometimes gathered too early.

Mr. D. C. Scofield—When the apples are ripe they should be gathered and put at once into the coldest place practicable, to cure, or sweat, for four or five days; as soon as this is over, barrel them and put in the cellar, keeping them as cold as possible without freezing.

Mr. Minkler—I want all my apples gathered in September, as soon as ripe.

A Voice—It is difficult to tell when apples are ripe and fit to gather.

Mr. Galusha—The chief end of all trees seems to be to perfect the seeds, so as to perpetuate the species. When the seeds are fully colored the fruit is ripe, or ready to be gathered.

Mr. Piper—Mr. Ordway, a fruit-grower of Freeport, gathers his apples in September, with good success. My Domines, picked the last of September, are keeping nicely yet.

The President called for

NEW BUSINESS.

Mr. Woodard introduced the subject of making an exhibition, as a Society, at the Chicago Exposition next autumn.

Messrs. Galusha, Minkler, the President, and others, favored making an exhibition at the State Fair, and also, if it can be done, at the Chicago Exposition.

Mr. Woodard moved the appointment of a committee to present the subject properly before the Society.

Carried.

Messrs. Galusha, Cochran and D. C. Scofield were appointed on the committee.

TRANSPLANTING EVERGREENS.

Mr. Barler remarked that the time and manner of transplanting Evergreens are subjects of much importance, and he would like to hear of the practices of members upon these points, which was agreed to.

D. C. Scofield—The time to transplant is when the tree first begins to grow. They will grow better, but may not live more surely than if planted earlier; but they should not be moved in and exposed to a cold wind. I moved, last spring, a block of evergreens, eight to ten feet high, beginning as soon as the sap was well in circulation, and finishing when they had made a growth of ten inches.

Those moved the earliest grew the best; but if shoots are about a foot long, they will droop and may not recover. I move large evergreens in

cloudy weather, if possible. I dig a trench upon one side, and tip them over toward and into it—in this way getting a good supply of roots.

Mr. Minkler—The secret of success is *no exposure* of the roots to sun or dry air, even for ten minutes.

Mr. Powell—It is not safe to wait in spring till the trees have made long shoots. I lost some trees in this way, one dry season. The roots commence growth before the top does, and it is safest to move the trees before the root growth has begun.

Mr. Hatheway—Experienced horticulturists can remove evergreens with success at almost any time; but for the farmers and those not skilled or experienced in these matters the safest time is as early in spring as the ground is in proper condition.

D. C. Scofield objected to planting in a soil not friable, but would plant as early as the soil would work well. Planters cannot be too careful about exposing the roots; the bark of the roots is quite porous, and the sap which circulates next to the bark, being resinous, if it is allowed to thicken, cannot be recovered. Sometimes, ten minutes' exposure to a warm sun kills the tree.

Mr. Barler—In Alton, where I have lived, we can work the soil in February, and evergreens transplanted then succeed well.

Mr. Powell said he never exposed the roots of evergreens to drying when handling. He had had excellent success in planting and watering well, in autumn, about three weeks before the ground froze.

Mr. Galusha said he had transplanted very many large evergreens successfully. He always shortens in the shoots by taking out the center one of each cluster on the outside of the tree, cutting close down to the junction, and in this way preserving the symmetry of the tree, and at the same time partially restoring the balance between top and root, disturbed in digging. He does not think it important, in moving evergreens, to remove a ball of earth, but the roots *must* be kept damp, and damp earth packed closely and *firmly* around and among the roots in planting.

Mr. Slade—For myself, with the trees at hand, I would plant at or about the time of the opening of the buds; but if we recommend no earlier planting, people will neglect to plant, as this season is one of the busiest times with the farmers. Trees should be mulched heavily. I have occasionally lost a tree or two by planting after they had made considerable growth. I would preach the doctrine of early planting or heavy mulching, or both.

Mr. Hatheway—If farmers wait till after corn-planting, they then find so much to be done that they are apt to neglect to plant altogether. I would recommend early planting.

Mr. Richmond—The correct time is before the buds open. Plant deep, settle the earth thoroughly among the roots, and mulch at once.

Mr. Woodard—I have had good luck in planting in April, May, June and September, but think April the best time.

The President—I have been transplanting evergreens several years; have transplanted many thousands of small ones, taking them up early, and heeling them in and planting as soon as the buds swell, but would not wait for the buds to swell in moving large trees, if I was ready earlier and the ground in good condition. European larch should be planted as early as the soil will work well in spring.

Mr. Powell recommended planting larches in autumn, as soon as the foliage is killed.

The President—The object in removing a ball of earth with the tree is to facilitate transplanting, rather than to secure the life of the tree. We can plant nearly twice as fast by taking the ball of earth with the roots.

The President announced the meeting adjourned to half-past seven o'clock this evening.

SECOND DAY—EVENING SESSION.

The Society convened at the hour appointed, with President Scofield in the chair.

The following report was read by the Secretary:

REPORT ON EXHIBITION OF FRUITS.

Mr. President: Your Committee, appointed to present the subject of making exhibitions of fruits next autumn at the State Fair and the Inter-State Exposition at Chicago, respectfully report—

That we recommend that this Society, both as a society and individuals, make exhibitions at the State Fair, competing for such premiums as are offered; also, recommend our members to make exhibitions at the Inter-State Exposition in Chicago, as far as they can do so without interfering with their exhibitions at the State Fair.

Signed by the Committee.

O. B. GALUSHA,
J. W. COCHRAN,
D. C. SCOFIELD.

LANDSCAPE GARDENING.

Mr. EDMUND HATHEWAY, from the Committee on Landscape Gardening, read the following report:

I desire to offer a few general suggestions, to the rural worker and thinker, on rural adornment. If our country is ever to grow lovely through man's tastes and labors, it is this class of persons who must accomplish it.

The farmer should take plenty of ground for special ornamentation, and if he has a somewhat irregular surface available for such a purpose, it should be used in preference to the smoother land, as it affords better opportunities for variety. If he does not take sufficient space, and is a person of taste, it will prove a matter of life-long regret. Many people have this to lament over. Their evergreens, hard maples, willows, box-elders and honey-locusts were planted close together, and now, when they have arrived at an age to display their beauty, they begin to deform each other. Every time the owner steps through his door-yard he sees a fine evergreen, or some other favorite tree, growing into hopeless one-sidedness or stunted worthlessness, and while he deplores it he usually lacks courage to do anything about it; thus his door-yard becomes a torment instead of a joy. It is likely that all the mementoes left of such door-yards, after awhile, will be a few tombstones of Lombardy and cottonwood. Whoever invented the country door-yard did the world a great injury. Since that time most country people find no place to put a fine tree but in the door-yard.

Plant trees liberally, but not indiscriminately. Every tree has its own beauties and its own place, but nothing can be more indefinite than the ideas usually entertained on these points. The most common thought seems to be, that if a tree or shrub is handsome in itself it will look well anywhere. The truth appears to be, that if we wish to produce fine effects by tree-planting, the adaptation of the tree to its place, not only by its general form and habits, but by the sentiments which it awakens in the beholder, is of prime importance. Trees which express strength, independence, retirement, shelter, seem better adapted than any others to our prairie homes. Our winters are cold and our winds are fierce; the trees must have strength and endurance to withstand them. Upon our broad open lands we seem to live in all out-door; we want trees that will shut us into the retirement and privacy of a home. We want trees that will warm and comfort the landscape. A home with oaks, maples, elms and evergreens has independence, intelligence and refinement associated with it. A home with poplars and other soft woods, chiefly, is a cheaply gotten-up and short-lived affair, and has a poverty-stricken look. When we see a house situated in the midst of soft wood trees, that have grown into a tangle, we are led to think that the owner was in a great hurry to reach respectability, but it is very doubtful if he has succeeded so far as his surroundings are concerned. We would not disparage the planting of the deciduous soft woods, but great care should be taken in regard to kind, place, and also amount.

Though a slow growing tree, there is none which assumes a pleasing appearance sooner, and which will give greater satisfaction, than the hard maple. There is no other deciduous tree that clothes itself in such fine apparel at the diameter of five inches. One or two in the pasture, a clump or two in your special grounds near the house, and a few, or a row even, if you choose, along the road, will never seem out of place.

There is no single tree that individualizes itself in a more characteristic manner than the elm when it attains age. It is especially welcome at the corners of the road, at the entrance gate, or as a roof tree. We are acquainted with a very large and ancient elm of nature's planting, which in middle life found itself standing in the angle where the main highway divides into two tracks, one running down through a valley, and the other skirting along the side of the hills. The travel converges and diverges beneath its wide arms. It is a landmark which can be seen to the verges of the hills, and if cut down would be missed.

The oak is a hardy, independent tree, stout enough in the shoulders to hold its arms out straight without splitting. The man who is so fortunate as to have a grove of old oaks, or scattering ones, about his dwelling, should be careful about cutting them away. Nothing which he can produce in the way of ornamentation, during his lifetime, will ever replace the loss of such old settlers.

The red, or swamp maple, as seen in the September woods of the East, is like the scarlet tanager among the feathered tribes. A tree or two of this species in a group of evergreens would, at the time of year when it puts on its scarlet, make a remarkable feature in the landscape. This tree in color is the pure red wine of autumn. Nothing in the landscape intoxicates like it.

Nothing can exceed the grace of a thickly-set group of black willows, when their plumes are swayed by the summer wind. If you have a stream running through or beside your farm, plant a clump of these trees beside it, if they are not already there. Even a low, moist place, if suitably located, will answer for such a purpose.

A great weeping willow is another graceful thing. It is a green fountain whose waters shoot up in a central shaft and break into a thousand sprays. I had no idea that this tree is so perfect, until I saw it in the lower valley of the Delaware, near Trenton. If one cannot have a fountain, this is the next thing to it. The climate of northern Illinois is probably too hard for this somewhat delicate tree.

The light-green cloud which envelops the golden willow in spring, when nearly everything else is bare, makes it desirable to have one or two of these trees where they can be readily seen at that season.

Most people plant trees and shrubs almost entirely for summer effect and benefit. Why not plant for autumn and winter as well? Summer has more than her share of glory. The fields of grain and forests of corn make most attractive features in the Western landscape; but we need to touch up our autumns and winters. Evergreens are the winter want of the prairie for shelter and beauty.

During a somewhat protracted stay in southern Central New York, which gave me summer and winter views of hill-land scenery, I found many things quite striking. The old pines have been mostly cut, but the young ones stand "liquid green" among the winter snows, growing on the hill-sides, and with here and there an ancient tree crowning many of the hill-crests. I saw more plainly than ever before, that if many of our knolls and ridges were crowned with groups of evergreens, as I suggested in a paper before this Society several years ago, the West would become as fair to look upon as she is now productive. In that hill-land region, the winds are not wild, searching winds like ours, but tame creatures that enliven but do not torment. Why should not tree shelter do for us in a great degree what the hills and trees do for that locality, give us warmer winter days and softer winds.

For the best effect in scenery, each group of evergreens should have some striking feature of ground surface associated with it. Nature not only plants them on crests, but on the sides of ravines; she scatters them in the pastures, and gathers them in the swamps. Along public roads I have found—in places where pine groves once stood, but the land is now used for tillage—the young pines packed so closely into the road-side fence corners as to obscure the fence in many places, and sometimes their borders extended to the very road track.

Most farmers consider the extensive planting of evergreens very expensive. The proper way to reduce cost is to set out a small nursery of hardy, free-growing kinds. The cost of small trees is little, and the labor of caring for them trifling. In a few years, they are ready for use during any leisure day in the tree-planting season. My own expense for small evergreens, sufficient for use on my farm, did not exceed thirty dollars. When they had grown to a size suitable for removal to already chosen permanent localities, with a team, low sled and a man to assist, I have removed and set out a large group in a day. The days spent in this labor are among the happiest of my life. It is a joy to raise a tree, to set it in its permanent home, and think that it will remain a monument of one's tastes and labors on the earth, for perhaps a century. For this farm I paid twenty dollars per acre, and in less than ten years I sold it for fifty dollars per acre. Farm adornment does pay in money, as well as in beauty. Dollars never return a heavier interest to the farmer than when put into attractive objects that will increase the charms of nature upon his land.

Woodlands keep the homestead in "good heart." No farm is complete without one, for beauty as well as utility. If it be close to the highway, and have some depth, it adds greatly to the apparent seclusion of one's premises. Distance is deceptive, and greatly magnified in woodlands. Deep green, retired, snug in winter and cool in summer, what fires light up a wood of mingled trees in autumn! An opening in the wood is rendered very pleasing if crimsoned, in September, with a patch of sumac. A few trees of the June-berry, wild plum and flowering log-wood will whiten its borders in May, and an occasional crab apple will flush it with red at about the same season.

A good sized and well kept orchard speaks much for the owner. Orchards, as well as woodlands that extend to the highway, should have depth to make them interesting. Pleasing effects can be produced by arranging the trees so that the higher colored fruits will have the most prominent places. The condition of the surface of an orchard has much to do with its attractiveness.

The condition of the highway, also, has much to do with the appearance of one's premises. A deeply plowed and badly washed road-side, with unsodded banks, mars the beauty of the adjacent grounds. There should be some protection against the lawlessness and stupidity of some road-masters.

The thought uppermost in many a farmer's mind, after he gets out of debt and has some money ahead, is to build what would be called, in the estimation of the world, a beautiful house. It must be put where the public will have a full view of it. So three sides, all blossoming in wooden contrivances, are held out for our admiration, while the fourth side, being designed for the pigs and poultry to look at, is left somewhat modest and decent. Pretentions to show usually prove a deformity.

Build the house rather "low and rambling," well hooded by a steep roof, projecting eaves and wholesome chimneys. We want to see evidence of home shelter and home fire. Why should the roof and chimneys be so constructed as to appear subordinate to the rest of the house? If the walls be of stone, they will grow handsomer with age. Build so that the house will show care for home convenience and home comfort. We don't care how many gables there are, if they express farm and family needs. Let the house lead a retiring life in the arms of its trees and broad fields. Make the house neat, convenient—elegant, if you choose—but never gaudy or pretentious with wooden trinkets. Its beauty should be enduring, like the beauty of the hills and prairies.

If the farm be properly ornamented by tree and vine, green slopes, autumn-tinted groves and sheltering firs, it were best that the house, the work of man, be modest as its owner should be, in the midst of these rich blessings from the hand of God.

REPORT OF COMMITTEE ON ORNITHOLOGY.

Mr. A. L. Cumings presented a report, which was read by the Secretary, entitled

OUR WINTER BIRDS.

Nature delights in contrasts. Summer comes clothed in all the colors that most delight the eye; and in the profusion manifested by the fruits, the fields and flowers, we are, perhaps, less appreciative of the bright-winged, many-hued, semi-tropical birds that flit across the landscape, than their exceeding beauty demands. But when the flowers are faded and the fruits gathered, when the crimson of the oak and sumac grows brown and sere, when the gold of the ash and hickory turns to copper, and the bright flame of the maple and ivy becomes ashes, what enhanced beauty do we

see in the blue and scarlet feathers flitting hither and thither among the denuded branches of our orchards and forests! These gayly colored visitors, the jays and woodpeckers, are not among our transient summer boarders; they come to stay, and enliven our winters—a service for which they are oftener abused than praised by the wingless biped called man. We propose for our toast, "Our winter birds."

The geographical limits of our Society are most unpleasantly near the "Boreal Pole" for a winter study of Ornithology, and the number and variety of our constant feathered friends are limited enough. Although extreme hardiness is required for wintering north of forty degrees of latitude anywhere, yet our Eastern friends can boast of many winter birds rarely if ever seen in the same latitude at the West. In accounting for this, we must remember that thermal lines do not follow closely geographical lines, and these denizens of the air note this more carefully than we, and render their knowledge of more practical avail. Yet this but partially accounts for the difference; there are the peculiarities of surface and soil, of exposure and shelter, which they are also quick to note, and which predetermine their choice of habitat almost irrespective of general geographical limits. Nor is the question of appropriate food an unimportant one, though not primary, in determining their choice. Nor does the kind or quality of food exert so great an influence upon the hardiness of the bird as we might at first suppose. The winter birds of high latitudes are nearly equally divided between flesh-eating and seed-eating birds with no appreciable advantage possessed by the former over the latter, so far as we can observe; each class is well represented, both here and elsewhere, among those who brave the utmost rigors of our northern winters. Of the first class are to be found the nuthatch, the little brown creeper and the titmice (black-cap and crested) with which every child is familiar. These are our true tree-scavengers; running up and down and around the boles of our lawn and orchard trees, closely scanning every crevice, peering carefully under every piece of loose bark, for the eggs or larvæ of insects which breed there, taking with a chirp of thankfulness what the gods send, or accepting their want of success just as cheerily. For the orchardist or fruit-grower these services have an untold money value. Of the other class we need only instance the snow birds, which gyrate in flocks through the snowy air during a storm, and the little tree sparrow, which seems to enjoy a degree of cold that few other birds will adventure; while these, perhaps, perform as rich a service to the farmer and gardener as the other class, by destroying the myriad noxious seeds of all unsightly plants and weeds with which the rank luxuriance of summer growth has fringed our fields and hill-sides.

Scarcely less hardy and bold than these are the less fastidious ones, which, like the jays and woodpeckers, feed on whatever comes to their net. They may and do prefer flesh, if it be at hand, but nothing comes amiss to them, or is absolutely rejected by hunger. The red-headed woodpecker is remarkably fond of apples; in fact, I have sometimes been suspicious that his apparent search for worms in decaying trees may have been but a pretense of an honest livelihood, to avoid the vagrant act,

while he stole our apples. The little black and white woodpecker, most commonly called sapsucker, one of our best known and most common winter birds, though less addicted to fruit than the other, is not yet of spotless reputation in that regard. These birds have no pleasant note, yet their harsh cry accords well with the season, and borne along the frosty air is very pleasant to hear. With field and forest robed in white we might fancy nature dead, and ourselves the only watchers by her shrouded corse, but for these sights and sounds of life around us.

The jay is the most interesting, as well as the most gayly colored, of our constant winter birds. He is constantly on hand, whether you particularly want him or not. You cannot call your fowls to their breakfast without his hearing you, and answering, whether he comes or not. If he has no more promising mischief on hand, he is sure to accept the invitation, and pounce down on your corn with a sharpened appetite. One of your properest partlet prudes will begin to ruffle at him, and drive him away. He resents the insult, and mounts a limb just out of reach, and screams back at his persecutor with all his might, until she turns again to her breakfast, when he places himself at once by her side, and keeps up his annoyance, perhaps during the entire meal. We are always delighted with the impudent tricks and impertinent mimicry of this feathered harlequin. We have for many years made it a point to be on good terms with this jolly fellow, even to the point of cultivating his most intimate acquaintance. The thickest place in the evergreen hedge is reserved for his shelter from the cold; we allow the morning glories to run riot over the latitices, in summer, in order that their seeds may be ready for his winter food. We clean away the snow and feed our fowls on the open ground, when it would be otherwise more convenient to feed under shelter, in order that he may claim a share. We feel amply rewarded for all these services by his constancy and perpetual jollity, regardless alike of cold or storms. He may have his faults, and they may be manifold, but in our judgment his cheerfulness, under all sorts of trials and hardships, amply atones for them all. It takes a better Christian than most are to receive all that is sent, or forego all that is withheld, alike with equanimity and fortitude, and this little bird may well teach us a lesson in this regard.

The question of shelter is the one which most concerns our lack of winter birds. Our treeless prairies are too bleak for any except the most hardy kinds. Many of the most prominent northern New England birds are quite uncommon here, owing to our want of shelter. The crow, one of the most common winter birds in Northern Vermont, during our early days, is quite uncommon in Northern Illinois, not so much because of the cold as the want of shelter, and high trees for roosting and nesting. About the middle of the present winter we heard the cawing of a crow, and on looking up observed three individuals of that family winging their flight across the heavens from west to east. These are the only specimens noticed by us this winter, and a gentleman raised in Northern New York spoke of the scarcity here of that bird, so common and familiar there. At the East he chooses the highest pines and hemlocks, where he

builds his nest of sticks, and rears his young beyond the reach of ordinary guns. The country which does not afford these or their equivalents is no home for him. With such places for security and shelter, he will brave the cold of the bleakest mountain regions, and enliven the entire winter day with his music, more vociferous than sweet.

Nor is he such a bad fellow, after all, as he is generally considered. It is true he steals a modicum of grain from the farmer, but he destroys mice and reptiles enough to do far greater damage, if left undestroyed by him, than he can do. He is, besides this, a scavenger of no mean pretensions, removing enough offal and filth in a season to poison the air around your dwelling, if unremoved. He is an omnivorous feeder, yet prefers flesh, in any stage, to the best of golden grain. He is, however, practically out of the ring, so far as our list is concerned, being at best but a visitor, coming and going, until sufficient and safe shelter is provided him.

We have no time to notice our winter birds of prey, nor yet to more than allude to those most graceful and beautiful, as well as useful, seed and insect eating birds which roam our fields and meadows, from the quail to the pheasant inclusive. The great usefulness of these birds requires their better protection by law, as well as their greater encouragement by farmers. In some places, where the quails have been nearly exterminated, live birds have been procured from the trappers, and kept confined and fed during winter, to supply the place of those so cruelly slaughtered. Beyond their value as game, and aside from the pleasure derived from the sport of legitimate hunting, they have been trapped and snared without any apparent motive, until our prairies are nearly free from their cheerful presence. The severity of some of our recent winters, together with the absence of the tall grass which formerly served as a covert in winter, partly accounts for their present scarcity; but we suggest that it would pay every farmer to preserve game on his own estate, not only by preventing its wanton destruction, but also by making artificial coverts, where they could be protected from the storms, and in supplying food for their use during long continued storms, like those of the present winter.

BIRD SONGS AND BIRD LABORS.

BY MRS. P. V. HATHEWAY.

Mrs. HATHEWAY read, in her usual pleasing style, the following interesting essay:

As fragrance is the crowning characteristic of the flower, so song is the crowning characteristic of the bird. We do not feel thoroughly satisfied with a flower if it has no odor, and we do not feel satisfied, or at least do not feel acquainted, with a bird which has no song. The song season of the birds is their day of perfection, as much as the blossoming day of the rose bush is the time for which the rest of its life seems made.

We have a thrush, the Alice thrush, quite plentiful in some parts of the Mississippi valley, I believe, though I have seen it but once or twice,

which observers tell us does not sing. I am not able to contradict this statement, for I only heard him call a faint, gentle *pe-o!* but I wish I could, for a thrush without a song seems as unnatural as an azalea bush without blossoms.

From the beginning of March unto the middle of July our woods and fields overflow with music. Our first comer, the shore-lark, tinkles his low song by the road-side in February. The bluebird comes long before the blue violets. His soft *ka-wet!* drops out of the softening March skies, and in a few days he is warbling around the bird houses and woodpeckers' old holes in the woods. The robin is our first-coming thrush; his music is martial, but its triumph is sometimes mingled with sadness. Our thrushes are our best singers. We have no finer songster here than the wood thrush. His silver *trill-i-dee* is the solo of the woods. Last summer I heard the hermit thrush in his own retreats among the high hills of the East, and I have never heard his strain surpassed. It is pure and ethereal as the hill-land air, and serene as the depths of the pine and beech woods where it is sung. The Wilson's thrush, or veery, which occupies lower grounds in the same region, has a short, ringing song, which, when heard from many throats along the edge of the woodlands, sounds like a chime of bells. Our own brown thrush comes in late April, overrunning with music. He practices it for hours at a time during May, on the tall tree-tops. The cat-bird, another thrush, keeps the low, moist thickets throbbing with his quaint, proud songs. The syllables used in the songs of all, or nearly all the thrushes, are full of liquid, flowing sounds, like the soft language of Southern Europe.

Next to the thrushes our sparrows are among our best musicians. The rich, tremulous warble of the rose-breasted grosbeck, which lives in the woods and groves beside our creeks and rivers, is hardly equaled by any other bird of my acquaintance. The pure, happy notes of the song sparrow may be heard every day, except a few in August, from his coming in the latter days of March, until his departure in November. Some of the finest sparrow singers are only passing visitors in Northern Illinois. In small flocks the lovely purple finch goes north in spring, and returns in autumn. He gives an occasional hint of a warble, but I never knew how fine his warbling was until I heard it among the pines and hemlocks last summer. Our May and October are sweetened by the hymns of the white-throated sparrow. His *er pe—pe—pe—pe-d-de pe-d-de pe-d-de!* is a little snatch of sacred song from the northern land. Then there is the fox-colored sparrow, with plumage like an autumn leaf, and a half-sung song in his throat. To no other family are we so much indebted for the music and joy of nature all the year as to the modest sparrows. With most of our birds the period of full song is short, but the sparrows sing the cool, fresh songs of spring amid the fainting heats of mid-summer, and I have heard the tree sparrow tinkle his strain in January—*e-chee-chiv-chiv-chiv-a-wait-wait-wait!*

The shrike and vireo family has several fine singers. The sweet, cheerful song of the red-eyed vireo, the slow, meditative strain of the yellow-throated vireo, are heard in all our woods, and the liquid,

laughing little lay of the warbling vireo among the groves and scattering trees about our houses. Even the white-rumped shrike, half brother of the butcher-bird, attempts a love warble in April and May.

The starlings and orioles are a family of minstrels. The bobolink—merriest hearted of all our birds—circles and sings above the meadows. The red-winged blackbird calls *uncle lee ! uncle lee !* about the swamps, and the cow bunting has a gurgle which "sounds like pouring water out of a glass jug." The meadow lark hovers across the fields, drops on the top twigs of the scattering trees, and sings his full, rich note, *e-chee-a-chip-pa !* He often sings on the wing, and while walking about on the ground. The gay Baltimore oriole has a rich, emphatic song, *tie-a-ru, co-tie-a-ru !* and the orchard oriole a rather higher-keyed strain, but very agreeable.

Some of the warbler family are sweet singers. The scarlet tanager has one of the richest melodies of the woods, and the black-throated green-back one of the purest.

The wrens are lively little creatures, full of sudden outpouring song. A house wren of my acquaintance last season sang to his mate nearly all summer about a *witcha watcha witcha widow !*

Many of our birds outside of the *Oscines*, or true singers—birds furnished with special throat muscles—make very pleasant music. Nothing can be more cheerful than the *bob-white !* of the quail, and the *phe-be ! pe-we-it !* of the common pewee. Few sounds are more agreeable than the notes of the whip-poor-will in the darkness, and those of the cuckoo at a distance.

The night singing of birds is especially attractive. A good many of our birds, which are usually only day singers, tune up in the night in the season of mating and nesting. My own night rambles have been well repaid in bird songs. In the moonlight nights of May, and sometimes June, the cat-bird is wild with delight. All along the banks of the creeks and rivers, and from the swamps, rises the strain, far purer and sweeter than by day. He tells, in a fine poetic way, to the night wind and the stars, that his mate is sitting under the leaves on four emerald eggs. Sometimes the tanager calls, or the water thrush sings one sudden, happy strain, and then is still. Once I heard the oven bird sing something quite different from the shrill little lay which does duty as his day song. It was a glad burst of sweetness, with the usual notes, softened and enriched, as its center-piece. Occasionally, on May nights, the voice of the meadow-lark rises from the lowlands, and from his perch among the vine-tangled shrubs the Maryland yellow-throat repeats his lively *chip-er-a chip-er-a chip-er-a chip!* In June, the cuckoo sings almost as much by night as by day; and one may sometimes hear, at long intervals, the pathetic *pe-we-o-wee !* of the wood pewee, and the emphatic *peach-a-pe-a* of the acadican fly-catcher. The whip-poor-will overlaps his night of melody onto the evening and morning songs of the thrushes. The song sparrow, the field sparrow and the black-throated bunting often sing at night in the season of incubation.

The song of the bird is his chief attainment, from an æsthetic stand-

point; his labors are all-important from a utilitarian. His work has two objects—to provide a home and food for his offspring, and to support himself.

The Baltimore oriole hangs a long basket, neatly woven of silkweed, upon some pendant bough, and it becomes the cradle of future singers. The hermit thrush sets her nest of pine leaves upon the shelving rocks. The wood pewee builds her nest so cunningly, of bits of lichens and similar materials, held together by filaments of cobwebs and worm silk, that it looks like a moss-covered knot upon the tree branch. The warbling vireo weaves a pensile nest in the fork of a twig, and adorns the outside with pendants of worm silk. The woodpecker cuts with his chisel bill a clean room in the heart of a tree. The chimney swift gums his open shallow nest to the inside of a chimney, or on the inner wall of a building. The cliff swallow puts his mud pockets under the eaves of buildings; he plastered them under cliffs before he found houses so convenient. The oven bird builds her nest upon the ground in the high, dry woods, and roofs it over with delicate strippings of grape-vine bark.

The labors of birds, in providing food for their young, are incessant and arduous. When the young are reared in the nest, both parents generally unite in the work, and it is kept up from dawn until dark. Provisions are usually brought as often as once in five minutes. As the smaller birds use insects exclusively, the number consumed by a young brood, in a single day, must be very large.

The labors of the bird in his own behalf are continued all the year round somewhere. It may be considered a fault that a few species are made with taste refined enough, like ours, to know that some tame fruits are good in the thirsty mid-summer days; but how does the account between nature and the smaller birds stand? All of them are eminently insectivorous during the period of reproduction; many live exclusively upon insects, while the remainder feed very largely upon them, whenever they can be readily obtained. The birds preserve the trees; they preserve the flowers and fruit; they preserve the grain. Those which love a little of our fruit occasionally are usually among our best helpers against insects.

When the dark days and the falling snows are here, and nearly all our summer friends are gone, the finches come to claim our winter, and offer us their assistance in keeping down the ever-present weeds, by eating up the seeds. We hear the tinkle of many voices, and see great flights of snow buntings wheel through the air. The snow is often gemmed with the crimson-crowned and crimson-breasted red-polls; and in some fierce storm there drops down among us the black-legged chestnut-collared Lapland longspur. The evening grosbeak pays us a visit. Once I noted that rare winter red-bird, the white-winged crossbill, dexterously picking out the seeds of the wild sunflower in November.

A few remarks were made, at the close of the reading of this essay, by the President, and Messrs. Minkler, Galusha, Hatheway and others, advocating the planting of groves and belts of timber, for the combined

results of adorning the landscape, furnishing shelter from the cold winds, and furnishing attractive homes for our friends, the birds.

On motion of Mr. MINKLER, a vote of thanks was given to Mrs. HATHEWAY for her entertaining and instructive essay.

On motion, the Society *adjourned* to meet at nine o'clock to-morrow morning.

THIRD DAY—FINAL SESSION.

The meeting opened at nine o'clock with prayer by Rev. Mr. WARDELL, of Franklin Grove.

REPORT ON PRESIDENT'S ADDRESS.

Your committee recommend that the subject of tree planting and the protection of forest trees, mentioned in the President's address, receive the special attention of this Society as one of superlative importance. Also, we advise the State Society to continue the distribution of the volumes of Horticultural Reports among the district school libraries of the State. Also, that, inasmuch as the Executive Borad of the State Horticultural Society has instructed its Secretary—Mr. O. L. BARLER, Hinsdale—to complete the Horticultural History of the State, by counties, request the members of this Society to aid him in the work.

Signed by the Committee. O. L. BARLER.
O. B. GALUSHA.

IN MEMORIAM.

The Committee on Obituaries reported as follows:

Mr. President: Your committee report that Mr. Joseph Walkup, of Nunda, Ill., died September 12th, 1876, in the sixty-seventh year of his age.

In the death of Mr. Walkup we feel that we have lost an earnest co-laborer in the cause of horticulture, a valuable citizen and an earnest, Christian gentleman. This Society most heartily sympathizes with his bereaved companion in this afflictive dispensation of Divine Providence, in the removal from her embrace of a loving husband; and yet we rejoice with her in that her loss is his gain.

We are also called upon to sympathize with the stricken hearts of our faithful friends and fellow-laborers, Hon. Lewis Ellsworth, of Naperville, Mr. D. Wilmot Scott, of Galena, and Mr. A. L. Cumings, of Galena, members of this Society, in the removal by the hand of death of their respective loving companions. While we each can weep with them in deep sympathy in their loss, yet some of us know too well from our experience the sorrows of their hearts. But there is light and joy beyond the tomb, as by faith we see them "over there."

Mrs. Ann Eliza Scott, wife of D. Wilmot Scott, died at Galena, Ill., October 15th, 1876.

Mrs. Chloe M. Ellsworth, wife of Hon. Lewis Ellsworth, died at Naperville, Ill., October 16th, 1876.

Mrs. Rebecca P. Cumings, wife of A. L. Cumings, died at Galena, Ill., Dec. 5th, 1876.

Animated with the Christian's hope and assurance of a glorious immortality, they passed away in triumph to their home in Heaven.

Signed by the committee.

D. C. SCOFIELD.
J. W. COCHRAN.
WM. A. LUKINS.

The report was adopted by a rising vote, and the Secretary was instructed to send copies to the families of the deceased.

REPORT ON CIDER AND VINEGAR.

Mr. HENRY DUNLAP reported as follows:

Mr. Chairman: Your Committee on Cider, Vinegar, etc., beg leave to submit the following report:

They found a display which was very creditable to the Society and the exhibitors, and deserving of high commendation for both the quality and number of samples.

The collection by Mr. A. R. Whitney, of Franklin Grove, is especially deserving of mention, as it showed that Mr. W. is supplying much needed articles of pure cider vinegar and cider. The packages were neat and the contents excellent. The following comprises a list of the samples on exhibition, each having its own peculiar merit, and all worthy: New cider, prime cider, prepared cider, cider wine, Concord wine, Clinton wine, cider vinegar, crab apple seed, and apple seed.

Of the cider wine, samples were shown ranging from one to seven years old, and one sample made by Mr. Whitney eighteen years since. The cider vinegar was excellent, and this pure and much needed article, manufactured by our fruit-growers, is destined, in time, to take the place of chemically manufactured vinegar, which is sold to consumers as pure cider vinegar. Many bushels of apples went to waste the past season, in the State of Illinois, which might have been made into vinegar, and returned the orchardists a good profit. We call their attention to this matter, and hope that they will act in that direction. Throughout the State there is a large market for a pure article of vinegar; and the many barrels of worthless stuff so called, which is consumed annually, for the want of something better, shows that our horticulturist need not hesitate for the fear of not finding a market for his products.

The display by E. W. Pomeroy, of Lee Center, receives the commendation of the committee, for uniform good quality of samples exhibited.

D. W. SCOTT,
H. D. EMERY,
HENRY M. DUNLAP, } Committee.

FINAL RESOLUTIONS.

Mr. J. W. COCHRAN, from Committee on Final Resolutions, presented the following:

Mr. President: Your Committee on Final Resolutions respectfully submit the following:

That WHEREAS, The closing days of our convention have been graced with the attendance of the cultured ladies and citizens of the beautiful village of Franklin, exhibiting an interest in our beautiful art which is as gratifying to us as commendable in them; and inasmuch as our stay here has been characterized by a genial hospitality extended towards us, making this the most pleasant, happy and edifying of any of our annual meetings, for much of which we are indebted to our whole-souled friend and fellow member, A. R. WHITNEY; now, therefore,

Resolved, That we tender our thanks to Mr. WHITNEY, his aged father, and the citizens of Franklin generally.

That we are grateful to Mrs. HATHEWAY for her beautiful poem on the birds and streams and fields of our country.

That a special notice is due Mr. HAUSEN for his large and varied collection of fruits of his own raising.

That the thanks of our Society are due to the St. Louis, Rock Island and Chicago railroad, the Chicago and North-Western railroad, the Illinois Central railroad, and the Western Union railroad; also, to the proprietors of the Hughes house and Franklin house, for reduced rates and excellent fare, and to the press of Franklin.

To the honored and ancient society of Masons, who gave up their handsome hall, we extend a heartfelt and grateful grip, and bid them God-speed in all their acts of humanity and justice and benevolence.

COMMITTEE ON EXHIBITION OF FRUITS.

On motion of D. C. SCOFIELD, a committee was selected, consisting of Messrs. Minkler, Slade and Nelson, to collect fruits for exhibition at the State Fair, and take charge of the exhibition.

They were authorized to furnish substitutes, if necessary.

REPORT ON LOCATION.

The committee appointed to consider and report upon locating the next annual meeting reported in favor of Batavia, stating that, although there was some question in their minds whether the accommodations there were all that could be desired, yet the action taken at the last annual meeting placed the Society under obligations to locate its meeting for 1878 at that place.

The report was adopted; but a further discussion was allowed—several members objecting to the location—which resulted in a reconsideration of the vote, and a recommitment of the report into the hands of the committee, with power to locate.*

* The next Annual Meeting will be held at Franklin Grove, Lee county, January 22, 23, 24 and 25, 1878, by order of said committee.

REPORT ON ARBORICULTURE.

D. C. Scofield, from the Standing Committee on Arboriculture, reported as follows:

Mr. President: It is mine to report on trees and forests. This I understand to be a favorite topic in your councils. From your earliest history, which extends back a period of only about eight years, you have had inscribed on your banner, "Timber Culture;" and, notwithstanding the skepticism of some and the apathy of others, it has continued to occupy the most important place in your deliberations, and has set in motion forces that will bear onward the blessings of civilization and Christianity through coming centuries.

In this report I propose to take a review of your work and its results to the present time.

In the words of inspiration, though reverently, we inquire, "Watchman, what of the night?" In the name of the honorable members of this Society—of the dead as well as the living—who, with animated zeal, have shared in the discussions of this subject, I reply:

As indicated by my motto-question, it was, comparatively, a night of slumber on the subject of American forestry. Long, indeed, had the question been asked, by the wise and prudent, "Whence is to come the supply for the timber wants of the future?" "Watchman, what of the night?" but no voice responded. No organized form of action appeared, nor dawn of approaching day arose. Strange as it may appear, yet nevertheless true, that, without concert of intended action, five members of your convention, who met at your first annual meeting at Freeport, from three different States (Indiana, Iowa and Illinois), had written essays on timber planting, and these papers were read and embodied in your report, or "Transactions of the Northern Illinois Horticultural Society for the years 1867–8." Here the great question of a nation's timber wants and necessities were discussed. You there urged your cause from the following leading considerations:

First.—From the exhaustion of timber supply: (*a*), by railroads; (*b*), in farm fixtures; (*c*), in the building of cities and navies; (*d*), in every department of human industry employing wood material.

Second.—(*e*), That pine timber, when cut away, was not followed by succeeding forests of pine. (*f*), That the wood material for manufacturing purposes was rapidly disappearing in the United States.

Third.—(*g*), That the climatic influences of forests, involving the protection they afforded from destructive air currents, regulating rain-fall, rendered the soil more productive and man more healthful and happy. (*h*), That a nation's wealth consisted largely in the abundance of its timber supply, and that its future prosperity, in an important sense, was suspended on the planting of forests.

You proposed and assumed the responsibility that, as far as practicable, you would urge this subject on every department of society, individuals, and associations of men organized for agricultural, horticultural

or mechanical purposes, railroad companies, and every branch of civil government. You urged the profits of timber culture, as far exceeding any other farm industry. You demonstrated your estimates from historic facts, gathered from the artificial forests of Europe—for as yet there were no extensive plantations in this country; but from those already begun you deduced conclusions. You demonstrated the rapid growth of forests, from the example of the Duke of Athol, "who planted the timber from which he had the pleasure of seeing a British frigate built at Woolwich yard in 1819–20." You have also produced living witnesses, who have seen the planting and the gathering time of these forests. You have shown, to a considerable extent, the annual consumption of forest product in the United States, and, with considerable exactness, the amount of pine lumber now standing in our forests. That the aggregate amount of uncut lumber is three hundred and twenty billions (320,000,000,000) of feet; that the annual consumption of pine alone is eight billions five hundred millions (8,500,000,000) of feet; that, allowing a small per cent. of the increase of the demand and loss by fire and other casualties, in less than eighteen years the entire pine lumber in the United States will be exhausted.

You have set side by side, on the same leaf, the blessings of a country abounding with forests and the calamities of a treeless waste; that countries once abounding in forests, teeming with prosperous populations, enjoying the luxuries of genial climates and productive soil, have become desolated when they have been denuded of their timber by their improvident inhabitants; that drouths, hurricanes, famines and pestilences follow a treeless country. You have hung out the signals of alarm to your own countrymen.

You have shown by demonstration that like causes which have desolated and depopulated other regions are already going on in this country, and that to a fearful extent; that these tokens existed in nearly the entire country east of the Alleghanies, from Maine to Virginia, and far to the south. Here the dried springs and river-beds, the timberless hills and valleys, the barren fields and abandoned homes, were fearful signs of woe.

You have not ceased in all your councils to advocate the imperative claims of this branch of American industry; you have instructed your representatives in Congress to secure the enactment of laws to enable and require settlers on the public lands to plant timber; your voice has reached every legislative hall and every department of human industry in the land; and, more than all, the ear of Him who holds in His hand the nation's destiny. Here we rest our cause for a brief moment, and inquire again: What has come of all this? or, in the language of our motto, "Watchman, what of the night?" I am happy, while standing on this eminence, and amid the rising glory of my country's greatness, to wave back the answer: "The morning cometh!"

Already several of the State governments have enacted timber laws, extending liberal patronage to all who will plant timber; and already Iowa alone has planted, within the last eight years, eighty millions of forest trees, thirty millions more than Mahomet Ali planted in Egypt,

which, within thirty years from planting, restored it from a rainless country to one of frequent showers.

Other States and Territories, under like patronage, have planted in like proportion.

Congress heard you call and loudly responded to it, and gives to every man a title, in fee simple, to one hundred and sixty acres of land, who will plant and care for forty acres of timber, which is known as the "Timber Act," and hundreds of millions of trees have already been planted by these frontiersmen. It has sent a delegate, Dr. John A. Warder, to the International Exhibition at Vienna, clothing him with abundant powers to survey, examine and report all that could be known of the woods of the old world, and the conditions and extent of their forests in their respective kingdoms, empires, principalities and provinces, and has submitted a report of great value to forest interests, which is now within the reach of all.

Congress has also had a special act passed, the 15th of August, 1876, under which a report on forestry was ordered to be prepared, under the direction of the Commissioner of Agriculture, and submitted to Congress. This act requires that a person be appointed "to prosecute investigations and inquiries with the view of ascertaining the annual amount of consumption, importation and exportation of timber and other forest products, the probable supply for future wants, the means best adapted for their preservation and renewal, the influence of forests upon climate, and the means that have been successfully applied in foreign countries, or that may be deemed applicable in this country, for the preservation and restoration or planting of forests." This work is now being prosecuted by Hon. Franklin B. Hough, of Lowville, N. Y. This is a gigantic measure, worthy the government that adopted it.

A forestry organization was formed in the city of Philadelphia about the year 1872, under the name of American Forestry Council, and is vigorously prosecuting this great enterprise. A part of the members of this body, with others, have formed a company, purchased several thousand acres of old Virginia land, and have commenced planting forests on a large scale.

The American Forestry Association was formed in the city of Chicago in the fall of 1875, and on the 15th of September, 1876, (centennial year,) held its first annual meeting, in Judges Hall, Centennial grounds, Philadelphia.

New England has awakened, and last year (1876) we find that the "Trustees of the Massachusetts Society for Promoting Agriculture," and with a view of stimulating this important branch of agriculture, offered the following prizes, open to all landowners:

First, For the best plantation of not less than five acres, one thousand dollars; for the next best, six hundred; and, for the third best, four hundred. These are to be planted in the spring of 1877.

Thus, from the plains of the West and the rock-bound coast of the East, from legislative halls, and the highest councils of the nation, comes back the echo, "The morning cometh."

Mr. SCOFIELD proceeded to read the following extracts from the report of the Board of Agriculture of the State of Maine, and remarks thereon:

Mr. Calvin Chamberlain, in an able memorial on the subject of forests, presented to the House of Representatives, in the State of Maine, in 1867, says:

> There is a portion of Hancock county (Maine), along the coast, that is now nearly denuded of trees. During the heat of summer the radiation from the parched surface affects the atmosphere to excessive dryness. The electrical and rain-bearing clouds that approach from the westward, as they come within this dry atmosphere are absorbed, and dissipated before their watery contents can reach the earth; while the clouds just north of them float on over a better wooded district, and yield a copious rainfall; and, on the other hand, the showers continue abundant in the more humid atmosphere of the contiguous bays and ocean.

Mr. Sargent says:

> That our climate is gradually changing, through the destruction of timber, is apparent to the most casual observer. Our springs are later, our summers are dryer, and every year becoming more so.

The abandoned lands have generally grown up with trees comparatively worthless for use in the arts, and which only supply, in after years, a straggling growth of an inferior fuel.

The most valuable trees have always been cut, often before they reached maturity; and as no steps have been taken to replace them, it is not astonishing that the poverty of our woodlands has reached a point which compels the inhabitants of the State to draw nearly their whole supply of lumber from portions of the country more recently settled. This is attended with so much expense and inconvenience, that many valuable industries have already moved from Massachusetts; and it is not improbable that at no distant day many others, depending on the forests for their existence, will be compelled to do likewise. By the census of 1870, there were in Massachusetts, besides the woodlands, nearly two millions (1,988,164) of acres of unimproved land. Of these, at least 1,200,000 are admirably suited for forest growth, and if planted with trees adapted to the various soils and situations, they would produce at the end of fifty years a crop, the actual value of which, in dollars, can only be reckoned by hundreds of millions.

It is impossible to estimate the indirect profit of such plantations in improved climate and water power, but that it would equal or exceed the actual value of the timber produced seems not improbable; while the benefits arising from so large an additional area of forest would be felt far beyond the limits of the State.

There are in Massachusetts, according to the last returns, 26,500 farms (a falling off of 7,500 since 1850, or considerably more than one-fifth of all the farms in the State, in twenty years,) which average one hundred and three acres in extent, or, in the aggregate, 772,500 acres.

The writer says:

But few experiments in arboriculture, except on the most limited scale, have been attempted in Massachusetts; but I will briefly describe the two most important, which are of special interest, as showing what our unimproved lands are capable of, if judiciously managed.

Mr. Richard S. Fay commenced, in 1840, planting on his estate near Lynn, in Essex county, and in that and the two succeeding years planted two hundred thousand imported trees, to which were afterwards added nearly as many more, raised directly from the seed; nearly two hundred acres being covered in all. The sites of these plantations were stony hill-sides, fully exposed to the wind, destitute of loam, their only covering a few straggling barberry bushes and junipers, with an abundant undergrowth of woodwax, always an indication in Essex county of sterile soil. He employed in his plantations oaks, ashes, the maples, the Norway spruce, Scotch and Austrian pines, but the principal tree planted was the European larch. No labor was expended on the land previous to planting, the trees, about one foot high, being simply inserted with a spade, and no protection has at any time been given them, save against fire and browsing animals. I recently visited these plantations, twenty-nine years after their formation, and took occasion to measure several of the trees, but more especially the larches. Some of these are now more than fifty feet in height, and fifteen inches in diameter, three feet from the ground; and the average of many trees examined is over forty feet in height, and twelve inches in diameter. During the past ten years about seven hundred (700) cords of firewood have been cut from these plantations, besides all the fencing required for a large estate. Firewood, fence posts, and railroad sleepers, to the value of thousands of dollars, could be cut to-day, to the great advantage of the remaining trees.

The second experiment was made by Mr. J. S. Fay, the brother of Mr. Richard S. Fay, of Essex county, on the extreme southwestern point of Cape Cod. A tract of land 125 acres in extent, which is now covered with Mr. Fay's plantation, was, in 1853, seemingly as little fitted for the purpose of tree culture as can be imagined. It was fully exposed to the cold northwest winds of winter and no less baleful southwest winds of summer, which come from the Atlantic loaded with saline moisture.

The variety of trees used are similar, and the success equal, to his brother, R. S. Fay.

The Scotch pine has made the most rapid growth, and then the European larch. Those taken from the nursery in 1853 are now forty feet high, and from ten to twelve inches diameter, one foot from the ground.

Enormously as the price of all forest products has advanced within the last twenty-five years, their future increase in value must be more rapid, as the supply becomes more and more inadequate to the demand. The great timber districts of the northern hemisphere have now all been called on to supply the always increasing wants of the civilized world; while no provision has as yet been made, except in limited areas, and on an entirely insufficient scale, to provide artificially the wood on which our descendants must depend.

In Europe, Norway and Sweden, Russia, Germany, and possibly Belgium, are the only countries which yield more forest products than they consume; while the other European countries, especially Great Britain and the extreme southern nations, are enormous consumers of imported wood.

In the United States, according to Mr. Marsh's estimate, Oregon is the only State in which there is an excess of forest. New York and Maine, which were formerly the chief lumber producing States of the East, now do not cut enough for the use of their own inhabitants, and depend on Canada for a large portion of their supply. And this seems to be true of all the States of the Union, excepting Pennsylvania, Colorado, Oregon, Florida, Michigan, Wisconsin and Minnesota.

The annual forest destruction in the three last States is enormous, and they must soon depend on extraneous sources for their domestic supply. How long the supply in

the British possessions in North America will last it is impossible to estimate. Heavy drains are already being made on it. During the three years ending June 30, 1871, the Dominion of Canada exported timber to the value of $63,131,608, gold; the trade increasing during that time about $1,000,000 a year.

Our railroads will consume annually 34,000,000 sleepers. At least 125,000 miles of fencing are required to inclose the railroads of the country. The cost of lumber and wood material employed would be $143,000,000, and it would take annually $4,000,000 to keep these fences in repair.

By the last returns I have seen (1872), there were in operation in the United States 65,000 miles of telegraph, which destroyed in their construction 2,600,000 trees, while the annual repairs must call for some 250,000 more. The 20,000,000,000 matches manufactured in the United States annually require, according to Mr. Marsh, 250,000 cubic feet of the best pine lumber. At least 1,450,000 cords of wood, principally pine, were required to bake the 2,899,382,000 bricks which the census of 1870 gives as the number made in that year, requiring the cutting off the trees from 36,000 acres. The manufacture of shoe-pegs consumes annually 100,000 cords of white birch wood, worth $1,000,000. In 1850, the value of the pine packing boxes made in the United States was $1,000,000; in 1870, they were valued at $8,200,000.

The value of the material made into woodenware in the United States increased from $436,000 in 1850 to $1,600,000 in 1870. The value of the material converted into agricultural implements in the United States in 1850 was only $8,000,000, while in 1870 it reached the enormous sum of $73,000,000, of which the forests must have furnished twenty millions' worth.

The enormous consumption of wood in this country will, however, be sufficiently shown by the following figures:

In 1860, the value of logs sawed into lumber was $43,000,000; in 1870, it was over $103,000,000, an increase which neither the growth of population nor the general advance in all prices can account for, and which can only be explained by the supposition that the uses to which forest products are applied are being rapidly extended, and that the foregoing demands on American forests are increasing.

But the statistics of the lumber trade do not show the entire destruction which is going on in our forests. (See Report of Department of Agriculture, 1865.)

Mr. Frederick Starr, Jr., in an interesting paper on American forests, estimated that during the ten years between 1850 and 1860 thirty millions of acres of forest covered land were cleared in the United States for agricultural purposes, or ten thousand a day for each working day during that time. Of the trees thus cut, probably the largest portion never found their way to the market, but were destroyed by fire for the sake of getting them off the land as rapidly as possible.

Ash Lumber.—In this report of Mr. Sargent, it is recommended that the white ash be extensively planted in forests. He says that already there is a rapidly-increasing export trade of ash lumber to Europe, Australia and the Pacific coast, from Boston and New York, and that the pos-

sibilities of this business can only be limited by the supply. According to the United States census of 1870, the number of rakes, spades, shovels, hoes and hay-forks made in that year was 8,347,478, and as the exportation of such implements is rapidly increasing, although still in its infancy, it is evident that the value of ash will be greatly enhanced at no distant day. It is also used in making ship-blocks, in turning, and in making the oars of boats. For this purpose they are eagerly sought after by foreign governments, as well as our own, and also by the great private steamship companies, and the mercantile marine of this country. The manufacture of oars is legitimately a seaboard industry, yet in pursuit of material it was moved from Massachusetts, first to Maine, and thence to Ohio and other Western States. Ash is coming into extensive use for expensive furniture, and for the interior finish of houses.

The wood of the sugar maple is largely used for making shoe lasts; 2,500,000 pairs of lasts are consumed annually in Massachusetts alone, which trade is greatly increasing.

Speaking of the European larch, he says it has always been a favorite for ornamental planting here, and has shown itself well adapted to our climate. In the eastern part of the State, specimens in open situations are abundant sixty feet high and five feet girth, three feet from the ground.

Mr. Sargent has estimated the profits on a plantation of ten acres of European larch to last fifty years, and after deducting value of land, labor, plants, interest on money on every investment, taxes fifty years, interest on taxes, etc., after making large deductions for casualties, has estimated the net profit at $50,282.75, or more than $5,000 per acre.

Mr. SCOFIELD had also prepared some statistics of his groves, which were, however, not read, but were, by vote of the Society, referred to the Secretary for publication.

This paper, as perfected by Mr. S., and forwarded to the Secretary, is as follows:

EXPERIMENTAL FOREST OF D. C. SCOFIELD, AT ELGIN.

This forest was commenced in 1858, with imported and American seedlings and seed. It stands on a rich, dry, undulating prairie; the soil, black loam, growing stiff and approximating clay at a depth of from four to six feet, where it is underlaid with coarse gravel.

It consisted of about twelve thousand trees when planted. I shall note alike the successes and failures, and the manifest causes.

More than half of the plants used were imported; the residue were plants from our native forests, and seeds planted on my own ground. A few trees were planted for ornament and shade in 1856 and 1857. Eight thousand were used in the first plantation, in 1858 to 1862, and four thousand in the second, in 1866. There were more of the larch used than of any other variety, in both plantings. The plants, usually about

eight to twelve inches in length, were transplanted in nursery rows, remaining two years, and those from seed in the seed bed two or three years, then were transplanted in 1860 to 1862 in plantation.

The ground had been cultivated three years after the first breaking of the prairie sod, which had become well pulverized, yet retaining nearly all the vegetable mould, and so completely decomposed as to afford immediate and abundant food for the tree plants. A similar preparation and condition should exist for all tree plantations.

The ground was prepared to receive the trees by plowing deep furrows to the depth required to set them, and at proper distances from each other. A level place, at a proper depth, was prepared by the planter, with a shovel; the moisture was not allowed to dry from the roots in their transit from the nursery to the plantation. The larch and deciduous trees were two to four feet in height, and the evergreen one and a half to three feet, having been transplanted in nursery once and twice, and consequently well stocked with roots.

In all cases, the plantation was carefully cultivated three to six years. Where the rows were of sufficient width, rows of white beans were planted. At this age, excepting the varieties of black walnut and elm, the trees would protect themselves from the growth of vegetation. Owing to the lateness of leafing of these last named varieties, with the white ash, except when planted with earlier leafing varieties, they required much longer cultivation.

Varieties of Evergreens used in Plantation.—Scotch, black Austrian and white pine, Norway and white spruce, arbor vitæ (American and Siberian), hemlock, silver fir (American and European).

Varieties of Deciduous Trees.—Black walnut, silver (or soft) maple, ash leaf (box elder), sugar (hard) and red-bud maples, English, red and white American elm, sweet and horse chestnut, European mountain ash, white ash, red-bud (of Southern Illinois), European and American larch and cypress.

First—The European larch is the most uniform in height and size in every situation, regardless of the kind of tree that is near it, standing twenty-eight to thirty-two feet in height, the diameters varying with the space they occupy, the greatest diameters of trees being fourteen inches one foot from the ground. Nearly every tree grew that was planted in the nursery, or that was afterwards transplanted in the forest. The average height annually attained, the first nine years, was two and a half feet, and until the fall of 1869, when a severe freezing came on the 19th of October, before the top center had ripened sufficiently to withstand it, the mercury running down nearly to zero. Since that time, or till the spring of 1876, the average annual growth upward did not exceed two inches, or twelve inches in six seasons. In 1876, an average growth of eighteen inches was attained. No insect or bird enemy has ever attacked these trees.

Experiment No. 1.—Planted a belt of trees running north and south one-third of a mile, with rows six feet apart, and four feet in the row. One-quarter of this distance was planted, three rows, with a row of larch

on the east side, next black walnut, and the third row soft (or silver) maple. The other three-quarters, or seventy-seven rods, had four rows, by adding one row of Norway spruce on the east side of the larch.*

The Norway spruce occupying the east side row in the remainder of this belt has suffered from too close planting, the distance being but four feet, and has an irregular growth in height and diameter, yet some have attained the full height of the larch, while four feet has proved a sufficient distance for the larch till now. The diameter of the spruce is four to six inches.

Next row west of the larch is a continuation of the black walnut, which made a fair growth while the cultivation of the ground continued, and until the west, or soft maple row, began to show signs of dying, which occurred in ten or twelve years; and while the early and abundant shade of the maples continued the walnut showed no signs of failure; but the total destruction of the maples and the very lateness of the leafing of the walnuts so exposed the ground to the sunbeams that the sun took full possession, and the trees became stunted and have made but little growth since, with the exception of ten or twelve trees. These were in a basin or sink, or depression of two or three feet, known on dry prairies as having an unusual depth of black vegetable mould gathered from the more elevated ground around. There the trees had a height of twenty to thirty feet and an averaged diameter of four to seven inches. Here the depth of this rich vegetable mould gave such a vigor of growth that it overcame the grass enemy. The trees in the remainder of the row have only a height of twelve to sixteen feet and a diameter of one and a half to three (1½ to 3) inches, and the greater part of them are valueless.

Soft (Silver) Maple.—The trees in this row grew vigorously the first two years, and attained a height of twenty feet and a diameter of four to six inches, when they began to decay, and were nearly all dead in fourteen years, and were removed.

Remarks on the Black Walnut.—While the combined early leafing of the larch on one side and the maple on the other continued, the walnut was protected from the grass growth and flourished, but when it had destroyed its neighbor and protector (the maple), then itself fell a victim to its own destroyer, the grass. There is little doubt but that the walnut, as also the oak, should be planted where required to grow, in forests, and thereby save the expense of transplanting, and the trees will be equally valuable.

Black walnut transplanted in a block, rows four feet apart and trees two feet apart in the row, cultivated only five years, the ground very soon became covered with a stiff sod, owing to the aforesaid cause; late coming into leaf; and now the trees are nearly all dead and the remainder valueless.

Fourth Experiment.—The walnuts planted in a block, and rows four feet apart and thinned to two feet in the row. This block was three rods in width and sixteen rods in length; one-fifth of this was in the basin land, the rest was common prairie. The entire plot received clean cultivation

* Whenever diameter or circumference is given, it is one foot from the ground.

eight years alike, and since no culture. The trees in the basin have a diameter of four to six inches, and height of twenty to twenty-five feet; those on the common prairie have a diameter of two to four inches and a height of fifteen to twenty feet, and the average amount of wood-growth is about one-fifth of those in the basin. The soil in these basins is equally dry, and the only advantage they possess over the common prairie is the depth of vegetable mould collected in them.

The French walnut veneerings that adorn our furniture are cut from the *roots* of the American black walnut, which, in many instances, are of greater market value than the trunk of the tree itself; therefore, to secure this, the seed of the tree should always be planted on very deep, rich, dry land, and never transplanted, so that the straight tap root which nature provides shall not be destroyed.

Fifth Experiment.—This is in a belt, running east and west, of five rows of trees, in the following order, beginning with the south row: 1st, one row Norway spruce; 2d, one row European larch; 3d, silver (or soft) maple; 4th and 5th, rows black walnut (transplanted). At the north of the walnut rows, and twelve feet distant, stands a plantation of larch and Norway spruce, which were four feet apart, and the trees stood four feet apart in the rows. This belt was cultivated about five years, when, owing to the dense shade of the Norway spruce and the early leafing of the larch and maple, together with the direction of the rows being east and west, all prevented the growth of grass. But at the end of ten or twelve years, and when the maple had a height of about twenty feet, and a diameter of four to six inches, as in the former case, they all died. But in this case the height and density of the shade of the larch and spruce trees on the south, and near the two rows of walnuts, and the proximity of the larch plantation on the north, all together, with the fallen leaves, have entirely kept out the growth of vegetation, except a few raspberry bushes among the walnuts. These walnut trees have a height of twenty to thirty feet, and a diameter of four to seven inches, and are fully equal to, and many of them excel, the trees in the basins where the grass grew among them. The largest growth of walnut I have, in diameter, is ten inches, which occurs on this dry or common prairie, under these most favorable circumstances.

Sixth Experiment.—This is on the farm of Mr. Benjamin Cox, one mile from my plantation, and the same quality of soil in all respects. Mr. C. planted the seed (walnuts) in 1844, and transplanted them twice, when they were young. He cultivated the ground for garden purposes the first twenty-five years, the trees standing twenty feet apart. Those which have received no cultivation since have a diameter of seventeen (17) inches, two feet from the ground; one tree has continued to receive cultivation on one side to the present time, and has a diameter of twenty-three inches, and height of forty feet. All of them have large spreading heads, and bear fruit in abundance. The bodies of these trees are seven to eight feet in height below the limbs.

The above experiments demonstrate: 1st, that the black walnut will succeed well on rich dry soil, provided the cultivation is continued till

the trees afford sufficient shade to protect themselves from grass-growth; 2d, when planted, without early leafing varieties to act as nurses, or without continued cultivation, they are a total failure. The European larch would act this part probably the best of any tree; first, from its early leafing; second, its upright, *trim* form; third, its tendency to enrich the ground with its annual leaf-shedding.* The sugar maple would do well as a nurse, rather than the soft maple, as it grows along with the black walnut, unharmed by its presence, as demonstrated by an experiment here, continued on the aforesaid Cox farm, of over thirty years' continuance. These "nursing" trees (as we call them), when planted in thick forest with walnut, act the double part, first, as a protection from the grass-growth; second, they secure a clean upright stem or trunk.

Silver (or Soft) Maple.—This tree promised well everywhere on my ground during the first ten or twelve years, and some trees in the most favorable locations have made a diameter, at the collar, of eighteen (18) inches in fifteen years. It is liable to break with wind in summer and ice in winter, and already, in many instances, shows signs of maturity and decay. It is well adapted to wet soils, where it becomes a valuable tree. It grows to great abundance and perfection in the timbered country north of Syracuse, N. Y., and as yet supplies the material for salt and flour barrels of Syracuse and Oswego.

White Ash.—Trees planted in 1856, of one inch in diameter and seven feet in height, standing two rods apart, as ornamental trees, are only equaled in beauty by the horse chestnut and sugar maple. These have a height of thirty feet, and diameter of eight to fourteen inches, and spread of limbs twenty to twenty-five feet. Trees of this variety have a strong tendency to reproductiveness, from sprouting from the stump of the original tree. The trees from seed planted in the year 1858, and transplanted in forest belts with European larch and black walnut, have formed straight, smooth bodies twenty-five to thirty feet in height, with a diameter of three to four inches.

Sugar (or Hard) Maple.—Trees planted twenty feet apart, seven feet in height, in the year 1856, now have a height of twenty-five feet, and diameter of six to eight inches, spreading twelve to seventeen feet. Trees from seed, planted in 1858, have a height of twenty feet, and a diameter of three to six inches. The growth of this tree on prairie soil is remarkably slow from fifteen to twenty years from planting, from which time it makes satisfactory growth. Trees planted one inch in diameter thirty-three years ago, separately, on the farm of C. H. Larkin, immediately adjoining my plantation, have an average circumference, at one foot from the ground, of three feet one seven-tenths inches (3 feet $1\frac{7}{10}$ inches); height thirty, and spread twenty-five feet.

A wild cherry tree on the same ground, from seed planted twenty-six years, has a circumference of five feet.

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*Already on the surface of the ground under the larch trees I find a formation of more than an inch in thickness of rich vegetable mould, which proves to be a rich fertilizer for house plants.

Ash-leaf Maple (*Acer Negundo, or Box Elder*).—Are remarkably rapid in their growth, some having a diameter of six inches seven years from planting, with a fine formed head of sixteen feet across. It is not liable to break by winds nor ice, like the soft maple.

Butternut.—Grows well under cultivation, having a diameter of five to seven inches, with fine proportioned head, planted separately, and bearing nuts.

Cypress—Slow in growth, evidently not well adapted to prairie soil.

Red-bud Maple.—Only valuable as an ornamental tree; grows slow.

American Larch (*Tamarack*) has grown nearly as rapidly as the European, but is more irregular in its form, branches wild and straggling, and less perfect in its straightness than the European; its height, twenty-five feet; diameter, four to six inches.

Elm.—The red (slippery) elm grows rapidly, some of the trees having a diameter of six to eight and even ten inches; but at this age many of them have an unhealthy appearance, and are unworthy of cultivation on dry land.

White Elm.—In regard to their growth, the variety of soil needed, and their habit of late leafing, they resemble the walnut, require the same treatment and produce the same results; valueless on the common prairie without continued cultivation until capable of self-protection. There is this difference between these two trees: while the *walnut* requires a deep, rich, yet dry soil, the elm will accept of and flourish on a wet and less rich and deep soil. With an annual cultivation for twenty years, these two varieties will make about the same growth on common dry prairie as they do in the "sinks" with a cultivation of four or five years.

English Elm makes a more vigorous growth and more beautiful foliage than either of the American varieties, and will do well with less cultivation.

Sweet Chestnut (*Common*).—A total failure on prairie soil. I have but one tree remaining in my grounds, and I know of no other in this county. It stands twenty feet in height, six inches in diameter, and preserved in slightly growing condition by the forest protection around it. "Total failure" is written on all the efforts that have been made in its cultivation on prairie soil, while it grows satisfactorily on the lighter soils of the Mississippi bluffs.

Lombardy Poplar.—A rapid grower and beautiful a few years, but is unhealthy and valueless after ten or fifteen years. Especially so on rich soils. Trees of ten years' growth are eight to ten inches in diameter, and twenty-five to thirty feet in height.

Horse Chestnut.—Hardy, but an exceedingly slow grower on prairie, yet grows well on gravelly or sandy soil.

EVERGREENS.—*White Pines* have a height of thirty to forty feet, and when standing in forest, six to eight feet apart, have a diameter of ten to fourteen inches; the same height and less diameter when standing in close forest plantation, and thereby denuded of side branches. My white pine plantation is from trees from seedlings gathered from the American forests in 1866, planted twelve feet apart each way. Six to ten feet in height in

1876, and filled with Scotch pine for "nurses," with trees grown from seed gathered from the trees imported and planted in 1858, and now six to ten feet in height. Cultivate till self-protected.

Scotch Pine.—In close plantations, four to six feet apart, have a height of twenty to twenty-five feet, and a diameter of six to seven inches. When standing separate have twice this diameter and form a beautiful tree, valuable as wind-breaks, growing surely and rapidly on nearly every variety of soil, and very hardy.

Black Austrian Pine.—Grows equally with the Scotch, and mainly valuable for ornament and wind-breaks.

Norway Spruce.—When planted alone, spreads nearly as wide as it grows in height, forming a beautiful pyramid. The greatest diameter of trunk of these is fifteen inches, from trees planted in 1857, one foot in height.

American White Spruce.—Is a beautiful tree, equaling, if not excelling, the Norway, and with the same habits.

Arbor Vitæ, American (*White Cedar*).—Forms a beautiful tree when young and standing alone, and it may be successfully sheared to any desired form. It grows slowly, and when planted closely in rows, six feet apart and only one foot in the row, has a diameter of two to four inches, and sixteen feet in height.

Siberian Arbor Vitæ is equally hardy with the American, and grows more compact and beautiful.

Hemlock.—When planted on prairie soil, makes a slow and dwarfish growth till twelve or fifteen years old; is better on hard soil.

American Silver Fir (*Balsam*).—A rapid, beautiful grower, its main value being as an ornamental tree; is less hardy in the extremes of cold following exceeding severe drouths, as in 1864–5; as in the case of the great drouths which then visited this western country, when a great many of the finest of the balsam trees, many of them forty feet in height, died.

European Silver Fir is too tender for this climate, and has only flourished in protected situations. It has a height of thirty feet and a diameter of six to seven inches, and should be used only as an ornamental tree. Yet this tree shows early old age, and is less beautiful in twenty or thirty years.

At the close of the reading by Mr. Scofield, the President retired from the chair, after calling upon Vice-President Minkler to preside.

DISCUSSION ON TREE-PLANTING FOR LIVE POSTS, ETC.

Mr. Minkler said he was setting Ben Davis apple trees and European larch for live posts—planting them eight feet apart. He nails a strip of lumber upon the bodies of the trees, when large enough for use as posts, and upon this fastens two wires and a board, which makes a good fence. At the same time, he gets the full cost of the fence in its benefits as a wind-break.

Mr. Lyman said he had tried Lombardy poplars for the same purpose, but had abandoned them on account of the shade and the exhaustion of the soil which they produced. Cottonwoods, he said, had been also used in the neighborhood, but cut down for the same reasons.

Mr. Powell spoke of transplanting European larches, and recommended autumn planting, as they start early in spring, and if planted after growth had commenced but a small percentage of them will grow, especially as planted by average farmers.

Several members testified to the almost certainty of success in transplanting larches, where pains are taken to avoid mutilating the roots, which are very tender, or exposing them to the sun or wind to thicken the resinous sap.

Mr. Whitney said he had transplanted the trees, which remained after spring sales, into his forest plantation, with good success.

Mr. Cochran said that in company with Messrs. Dunlap and Egan he once procured a cargo of larches from the swamps of the north, taking pains to keep them in damp moss till planted, and they nearly all lived.

D. C. Scofield—There is money in timber-planting, but there is a moral influence in this thing which is of far greater value. Let us avoid the mistakes of our sister States east of us, and plant trees and use every effort to preserve those already growing. Every man who owns land, and has the good of his fellow men at heart, should plant trees.

Mr. Minkler recommended the Norway spruce as a hedge tree. A broad close base should first be established, and then a most beautiful hedge can be formed, as it will bear shearing as closely and as often as almost any other hedge plant.

Mr. Powell spoke of his hedge of Norway spruce, which is eight feet broad at the base, seven feet high, and two feet across on the top. This hedge will turn stock. He regards this tree as the very best one for ornamental hedges.

Mr. Woodard thinks it important that evergreen plants intended for hedging should be prepared in the nursery, by frequent shearings and several transplantings.

D. C. Scofield spoke very favorably of the white ash to plant for timber; twenty-five years from planting it will be worth $2,500 per acre, giving at least $50 per acre net profit.

Mr. Minkler (Chairman) spoke with feeling upon the progress already made in horticulture, since the organization of Horticultural

Societies in the State. He had engaged in and prosecuted his horticultural labors as a delight, mainly because the results of such labors are to bless his fellow creatures, as well those who are to come after us as those who are now upon the stage of life.

He exhorted the members of the Society, as his closing words, to *plant trees, and take good care of them.*

The hour of adjournment having arrived, the Chairman announced that this harmonious and pleasant session would close by singing the Doxology.

Whereupon the members rose and united in singing; after which the Chairman announced the meeting

FINALLY ADJOURNED.

LIST OF MEMBERS

OF THE

HORTICULTURAL SOCIETY OF NORTHERN ILLINOIS,

FOR THE YEAR 1877.

NAME.	POST OFFICE.	COUNTY.
Atkins C. H.	Chicago	Cook.
Barler O. L.	Hinsdale	do.
Bill Chas. B.	Franklin Grove	Lee.
Black H. A.	do.	do.
Brown A.	Dixon	do.
Brubacker —	Nachusa	do.
Cochran J. W.	Blue Island	Cook.
Cotta John V.	Lanark	Carroll.
Cumings A. L.	Galena	
Curtis Samuel	Franklin Grove	Lee.
Dunlap Albert	Champaign	Champaign.
Dunlap Henry M.	do.	do.
Dunning A.	Jefferson	Cook.
Dysart A. P.	Nachusa	Lee.
Eby J. R	Lanark	Carroll.
Ellsworth Lewis	Naperville	DuPage.
Emert Henry	Nachusa	Lee.
Galusha O. B.	Morris	Grundy.
Garrison J. H.	Greenwood	
Gilkerson T.	Marengo	McHenry.
Graves H. C.	Sandwich	DeKalb.
Hanger J.	Franklin Grove	Lee.
Hatheway Edmund	Eleroy	Stephenson.
Hausen Charles	Franklin Grove	Lee.
Hausen Norman	do.	do.
Hausen W. H.	do.	do.
Hewitt G. W.	do.	do.
Hill David	Dundee	Kane.
Hussey Amos.	Franklin Grove	Lee.
Kent J. W.	Dixon	do.
Knowlton J. S.	Byron	Ogle.
Lahman D. F.	Franklin Grove	Lee.
Lahman J. C.	do.	do.
Lukins W. E.	Rock Falls	Whiteside.
McWhorter Tyler	Aledo	Mercer.
Minkler S. G.	Oswego	Kendall.
Nelson W. T.	Wilmington.	Will.
Norris William	Marengo	McHenry.
Patterson D. C.	Batavia	Kane.
Peck D. F.	Marengo	McHenry.
Pennington L. S.	Sterling	Whiteside.
Peterson P. S.	Box 383, Chicago	Cook.
Piper D. J.	Foreston.	Ogle.
Pomeroy E. M.	Lee Center	Lee.
Powell C. R.	Sterling	Whiteside.
Pratt W. A.	Elgin	Kane.
Prescott C. E.	Marengo	McHenry.
Reynolds J. P.	Chicago	Cook.
Richards E. A.	Geneseo	Henry.
Rogers J. S.	Marengo	McHenry.
Rooney P. C.	Franklin Grove	Lee.
Runyan Philip	do.	do.
Sanders Edgar	93 Madison street, Chicago	Cook.
Scofield D. C.	Elgin	Kane.
Scofield L. K.	Freeport	Stephenson.
Scott D. W.	Galena	
Sitts John D.	Franklin Grove	Lee.
Slade S. M.	Elgin	Kane.
Thompson W. S.	Franklin Grove	Lee.
Vaneman W. W.	Yorkville	Kendall.
Vaughn J. C.	Ashland Block, Chicago	Cook.
Wagner John B.	Franklin Grove	Lee.
Whitney A. R.	do.	do.
Whitney J.	do.	do.
Wittbold G.	127 Clark st. Chicago,	Cook.
Woodard L.	Marengo	McHenry.
Yale Charles	Franklin Grove	Lee.
Zug Israel	do.	do.

HONORARY MEMBERS.

Black Mrs. H. A., Franklin Grove, Lee Co.
Hatheway Mrs. P. V., Eleroy, Stephenson Co.
Mardle Rev. Joseph, Franklin Grove, Lee Co.
Miller Mrs. A., Franklin Grove, Lee Co.
Rooney Mrs. J., Franklin Grove, Lee Co.
Thompson H. M., St. Francis, Milwaukee Co., Wis.
Whitney Mrs. A. R., Franklin Grove, Lee Co.

Galesburg Horticultural Society.

REPORTED BY ALBERT J. PERRY, SECRETARY.

The past year, to the Galesburg Horticultural Society, has been one of unusual pleasure and profit. The Society organized for the season by electing the following officers, viz. :

President—Prof. J. V. N. Standish.
Vice-President—Mrs. Capt. Fuller.
Treasurer—Mrs. J. V. N. Standish.
Secretary—Albert J. Perry.

Executive Committee. — T. Judson Hale, Chairman ; Dr. A. G. Humphrey, R. W. Hunt, Mrs. Cordelia Willard, Mrs. J. V. N. Standish.

It was thought by some of our members that the Society had nearly outlived its usefulness. The various topics embraced in the object of its organization had been considered, and pretty thoroughly discussed, and it was felt that nothing particularly new would result from our meetings. Contrary to expectation, however, our meetings have been unusually well attended, and the Society may feel a just pride in the fact that greater and more perceptible improvements have succeeded their efforts in that behalf, than in any year previous.

Among the subjects which have been discussed by the Society, during the past year, are " The English Sparrow," " Public Parks—the Best Mode of Managing Them," and " Tree Planting and Home Adornment ;" and it is upon these subjects that I desire to make a report.

We have had no experience with the English sparrow, and conse-

quently our discussion on this subject was of a less positive character than it has been when the members supposed they knew what they were talking about. The general sentiment, however, was against its introduction. It was feared the rapid increase and pugnacity of the English sparrow would have a tendency to drive away our native birds. Such was supposed to have been the result in other cities where it had been introduced; and it was thought its greed for insects and worms ought to be very great, and its appetite for fruit and grain proportionately small, before consent would be given to exchange the music and loving dispositions of the one for the incessant chirping and quarrelsomeness of the other. His character was said to stand high in Baltimore and Washington, but his recommend from those places was not indorsed by our Society. Collaterally to this question came the discussion of the destruction of birds in general that commit depredations on our fruits. This subject had been alluded to on previous occasions, and the relative positions of our speech-making members seemed to be well understood beforehand. The discussion was therefore entered upon with a zeal worthy of a more intricate subject. On one side were Messrs. HALE, BEATTY and STANDISH, with their religion of love, entering the plea of "enough and to spare," and on the other side were Mr. HUNT and Judge KITCHELL, taking the more orthodox ground of "an eye for an eye and a tooth for a tooth," contending that retributive justice demanded a wise discrimination in the treatment of the feathered tribes.

MR. HALE said he was strenuously opposed to the indiscriminate destruction of birds; and although it had become a question whether we shall have birds or fruit, he preferred to be deprived of a portion of our fruit than our song birds. The law protects birds only by prohibiting the shooting of our neighbor's birds; but it appears brutal to shoot them when they can be seen rearing their young.

MR. HUNT said that the bird question was interesting to all, and it would seem that the author of the statute protecting birds loved them, and nothing else. The robin, cat-bird, sparrow, and some others, ought not to be protected. He took the ground, in regard to birds that destroy our fruits, that they should be shot when they are committing their depredations, and he felt he was right. He could find no writer recommending any particular bird to destroy the insects that injure our fruits. He had never seen a bird that would eat cucumber bugs, and he had come to the conclusion that it is not every bird that is beneficial to man, and we ought to shoot those that we know are thieves and robbers.

Mr. Beatty said the good and bad are so mixed that it is hard to distinguish them. All birds were useful to him as a citizen. The blue-jay eats more worms than any other bird. He is a perfect gentleman, holds up his head and does no one harm. The robin, whom some condemn, eats worms enough to more than pay for all his depredations; and there is a whole class of birds that work industriously all summer, eating worms and insects. In the plum orchard, the hen would probably stop the curculio pest. Many of our birds are game birds in New York city. They are caught by thousands in the South, and shipped to the New York market for the table; and we may have to send missionaries to that city to educate them on the subject of birds.

Judge Kitchell had no feeling like Mr. Hale in regard to birds. He could not sit down and see them destroy fruits, and bear it, because some one thinks it a sin to destroy them. The worms destroy our fruit, and we destroy them, and he would serve the birds the same, when they commit their depredations. He had no doubt hens would do good in a plum orchard, but not the first year. The fruit must be eaten to destroy the curculio, and then the next year the crop will be plentiful. Pigs are serviceable for this purpose.

President Standish said his sympathies were with the birds. Some insects multiply by the hundred thousand to each pair, and a bird that destroys a few of these insects of course checks their enormous increase.

MARCH MEETING.

At a meeting of the Society, held at the residence of Hiram Mars, Esq., on the 21st of March, the subject of "Parks" was discussed.

Mr. Hale, in opening the discussion, stated that some system should be adopted in the care of a park. The grass plats and lawns should be protected. People should understand that they are not to walk on the grass. Walks should be provided; places excavated, and mounds formed, to make the parks ornamental; and if we *must* provide for loungers, let provision be made for them alongside of the walks, and not allow them to stroll over the grass at will. The trees should be kept trimmed, and the whole put under the supervision of a competent person. He deprecated the planting of soft maples. Every breeze breaks them down, and they are constantly dying out. He strongly recommended the Norway maple for park purposes. Mr. Hale then offered a resolution to the effect

that the City Council of Galesburg be memorialized to provide by ordinance for the creation of a Board of Park Commissioners, which should have charge of the public parks of the city. Mr. Hale further recommended the red maple, magnolia, acuminata and tripetala, also the tulip tree.

Dr. Humphrey said no man should be trusted to plant a park of trees who was not skilled in ornamental gardening. We should plant for fifty, yes, for one hundred years in the future, and none but men of experience and culture were fit to be intrusted with such work. Only persons who have studied the art can tell what will be beautiful after a growth of fifty years.

President Standish said, "a thing of beauty is a joy forever," and this was applicable to trees. In planting trees we should have the rule of rhetoric in view, "unity, variety and harmony." Should we plant all soft maples we should have unity, but no variety, and no more should be planted in Galesburg. There are trees, of equally rapid growth, that are much more beautiful. The elm, the Norway maple and the varieties of magnolias are much more desirable.

Mr. Hunt said he always praised the bridge that carried him safely over. He could not speak of the soft maple as others do. Perhaps the time has come when we can get other trees to take its place, but it has done us much good in the past. Our park was planted about fifteen years ago, and it was the best that could be done at that time. He did not think the magnolia as desirable as the President did. They are not considered so hardy, except the magnolia acuminata, and perhaps the tripetala.

Mr. Hale's motion was then passed unanimously, and he was authorized to lay the matter before the City Council.

APRIL MEETING.

Among the many things said at a meeting of the Society, held April 28th, at the residence of David Sanborn, Esq., the following ideas were advanced by Mr. A. N. Carpenter, in a paper which he had prepared, and which he read at that time:

First, Sap does not circulate in the tree, but remains equally distributed throughout, changing with the seasons from a watery condition

in the fall to condensed sap in the winter; then to a watery condition in the spring, and from that to a milky and fibrous, and lastly, a woody condition, as the leaves start and the season advances.

Second, In trimming, cut the collar of the limb away, and if the knot does not become dry, a growth of wood will be laid over it, and in time the knot will become lost, and its place be filled with nearly straight-grained wood. To keep the knot green, so as to facilitate healing the wound, he recommended a plaster of earth to be applied to the wound.

Mr. Carpenters' ideas were pretty well considered at the next meeting of the Society, which was held at the residence of Capt. Fuller. The following is a summary of the discussion:

President Standish said: I don't know where Mr. Carpenter gets his theory that sap remains in the tap all winter. It contradicts all experiment. Spencer and Johnson have made experiments which prove that the sap ascends in spring and *works*, or is elaborated through the leaf and returns in the inner bark in a form suitable for the new year's growth. Mr. Johnson states that he has inserted the lower end of a limb into coloring material, and after awhile it would be found descending into the inner bark, but never ascending, which shows that this is the manner of circulation in exogenous trees. Mr. Carpenter is also incorrect when he states that trees lose their knots; a knot which is once formed in a tree remains until the tree decays. I cannot exactly agree with him as to the time for trimming trees. If we trim for a growth of wood, we may trim in the spring; but if we desire the wound to heal, we should trim in June or July, when the elaborating sap is descending, and the medicine, or healing salve, is at hand for immediate application.

Dr. Humphrey asked if the President had ever made sugar, and if so, on tapping the trees, which way the sap flowed, up or down? Also, if he had any evidence that the sap flowed at all before the abrasion was made in the tree?

President Standish replied: I have made maple sugar enough to sweeten you all, and will say, that if the trees are cut early in the spring the sap will go up and out, and I will say it runs both ways—up and down. But this is not the sap that heals. It is only the sap that has been elaborated through the leaves that heals the abrasions of the trees.

Dr. Humphrey said: I think the philosophy of Prof. Standish in regard to the circulation of sap is correct, but I do not think the sap circulates until after the growth begins, and abrasion starts the circulation. The sap is in the tree in a highly fluid state, and when the tree is abraded it begins to flow.

Mr. J. W. Dieterich said he had noticed in cutting hickory wood in the spring that the sap seemed to be through the entire length of the tree, not between the bark and new wood, but between the new wood and the wood of the previous year's growth.

Mr. Hale stated that the discussion of this subject might be made very profitable, but if profitable at all, it must bring out something that will be practicable, as the best time to trim. I argue that the best time to trim is when the tree possesses the greatest reproductive power; but this time may not be correctly stated. It is a question of fact. The tree puts forth a growth at one season of the year, and hardens it at another. Prof. Standish has investigated this matter very thoroughly, but is wrong if he states that sap circulates in the heart-wood of the tree. I, too, am an old sugar-maker, and can say from experience that sap does not circulate up or down in the heart-wood. Sap-wood is its only channel. It is important that we philosophize enough to discover when the growth is active. My experience is, that late in May or early in June is the best time to trim, but it may differ somewhat in different seasons.

Mr. Carpenter stated that he could say nothing except what the tree said. At the end of one year's growth it was but a little stalk, with a pith in the center, and but few limbs. This stalk never grows any more. Growth consists in laying a sheath or layer around this stalk, which sheath adds to the height. Each limb connects with the center, and if knots are not lost, why are they not seen in our clear lumber? Apple trees have two seasons of growth—in the spring and again in August. If you do not trim in the spring, you can only get the benefit of the August growth. The sap, circulating through the pores of wood, has the tendency to straighten them.

Mr. Hale said: I have seen thousands of logs that were cut through the center, and I always found these knots which are formed by the early limbs of the tree. When once they are formed, they forever remain. So I say, Mr. Carpenter is wrong in his idea that knots are worn away. Our clear lumber comes from the sides of the tree.

President Standish said the process of growth is carried on by the addition of cells, and when the cells are once formed they never change.

Mr. Hale said the Society had occasion for congratulation and rejoicing. A measure that originated with this Society—that of a competent park control—has become a fact; and we take great pleasure in knowing that this measure is in process of perfection.

JUNE MEETING.

At a meeting of the Society, held at the residence of Prof. STANDISH, June 6th, the following paper on Home Adornment was read by Prof. COMSTOCK:

Home adornment is so extensive a subject that I can, in the few moments allotted to me, do no more than mention a few points. We may first define the term. To adorn, is to embellish; to ornament, is to beautify; but, inasmuch as this is a Horticultural Society, whatever pertains to architecture, painting, and the plain arts in general, is excluded from the discussion. Home adornment for us, then, will refer to ornamentation by the cultivation of trees and plants. The building of conservatories might be included; but we will leave that for the few, and devote ourselves to what interests the many. Landscape gardening might be made our theme; but there is so little opportunity for the practice of that art on an extended scale, that we direct that subject to those particularly interested. But, with all these limitations, we find it difficult to approach our subject, owing to the wider distinctions between the houses, even in our own city, to say nothing of the country in general. An ornamentation is something added, not for use, but for the sake of beauty. The man who planted his fruit yard full of current bushes, did nothing in the way of adornment, though a nicely trained currant bush, with its garnet-colored fruit, has some claim to be called beautiful. Neither do apple trees, beautiful as they are when in blossom, serve to adorn a home. Anything chiefly useful cannot be used for purposes of adornment. To surround a house with a meadow, from which the grass is cut for hay, is not adornment. I suppose the practical thing for us to do, is to discover what to plant in our small door-yards and grounds which shall serve to make the surroundings of our homes in some sense beautiful. To begin, then. A lawn is well-nigh indispensable, not for profit, but to be kept well shaven till the grass becomes fine and velvety. Such a plot of ground, with its edges sharply defined, is like an emerald in the setting of a home. Shade trees, properly placed, so as not to prevent the growth of the grass and necessary plants, are indispensable. The elm, the cucumber, the tulip and the sugar tree may be named first on the list. I place the rose first on the list of shrubs, then the spiræas, syringas or Philadelphia lilacs, fringe trees, Italian honeysuckle, etc. Then perennial herbaceous plants, as peony, dicentra, pinks, sweet-williams. I name plants that are within the reach of everybody. A bed of verbenas and a few geraniums, and the varieties of coleus, set-off the grounds finely. These lists may be indefinitely extended, the limits being the purse and the size of the plantation. The trouble is not being able to find enough, but in the other direction. We all plant at least two or three times as many trees, etc., as the ground will support, expecting to remove one and another as they become crowded; and then we have not nerve enough to cut down what have become favorites after years of cultivation and care. Thus, trees are crowding and injuring each other in our yards, and in our parks, and

along our streets. A few thrifty trees or plants well cared for answer the demands of home ornamentation. Almost any tree or shrub, grown where it has plenty of light and air, is a beautiful object. Think of a yard destitute of grass and trees, with the accumulated debris of years, in the shape of old tin pans, boilers, oyster cans, paper from the walls, straw, chips, bits of coal, barrel hoops, etc., scattered everywhere, and you have a place (hardly a home) without adornment. Compare such a picture with what you may see by looking out of these windows, and imagine, if you can, the difference of results in respect to the cultivation of taste and love of the beautiful. One home tastefully ornamented elevates the standard of taste in the whole neighborhood. Barn yards, chicken coops, wood piles, will be banished from the front and sides of the house to the rear, and concealed by hedges or fences, and some attempts at improvement will be apparent even with the most busy and practical. Once in a while we see ornamentation overdone. A small yard, for example, is cut up into a great many little flower-beds, and great masses of petunias, poppies or hollyhocks grow without order or arrangement everywhere. The stumps of defunct trees are capped with old stove bottoms, tin pans, or wornout chopping bowls, in which grow a few withering, stunted starvlings of plants; a walk of coal cinders, gravel, grass, plantain and weeds leads through this scene of deformity into a house whose walls are covered with pictures made of corn and beans and pumpkin seeds framed in rustic style. Everything is so rustic that rusticity itself is made to blush at the caricature. But, even these mistakes are better than that cold, calculative spirit which never spends a cent to gratify the love of the beautiful.

Mr. Hale said: I do not care to say very much on the subject this evening, but I do not think the right thing has been said yet, and, as the record now stands, a very erroneous impression will be created. Home adornment is not expensive; it is cheap, and any one may gratify their taste to a very satisfactory degree, if they will try, but they must begin at the foundation. The basis of home adornment is *neatness;* without this, you cannot accomplish anything, no matter how much money you expend. It requires clean culture. It will not do to let the grass grow in the corners and in ugly, uneven-looking spots about the yards. It should be cut smoothly, and at the same time not be allowed to grow until the horse gets hungry. Don't let the limbs of your trees drag on the ground, making it impossible to get around so as to cut the grass, but trim them up and cut the grass neatly under them, and you will add greatly to the appearance of your homes. The greatest trouble is, people try to do too much. Capt. Fuller has too much ground; Mr. Dieterich has too much ground; Knox College has too much ground. If Knox College would sell off all the ground not needed for college purposes, and then fit up the remainder in a style dictated by good taste, it would be a

very attractive spot. It used to be said that the "king can do no wrong." This must be interpreted: "the king ought to do no wrong;" and this is very applicable to our city government. It ought to do no wrong, but it should set an example of neatness to all the inhabitants. Our parks should be kept in such a manner as to encourage neatness in individuals in the management of their grounds.

PRESIDENT STANDISH said: The evening is too far gone to make many remarks, but I would like to talk upon what constitutes the standard of taste, for there is such a standard. But we must not confound natural with artificial taste. What was in good taste among the ancient Greeks and Romans is good to-day. They took their standard from nature, and so when we see a beautiful cluster of trees or shrubs it is our effort to reproduce it in our grounds. Three trees may be arranged with good taste, and a square rod of ground may be made a beautiful lawn. While I agree with Mr. Hale as to neatness of culture, I take issue with him in regard to trimming evergreens. I recollect it was my mother's first care in the spring to get the door-yard in order, and I used to be called out to pick up all the sticks, straws and chips that had accumulated in the winter, so as to have nothing but the green grass to be seen. But in regard to evergreens, I would say, don't trim them up from the ground. The lawn ends at the top of the tree and it should have that appearance; and you cannot have that effect if you trim them. Of course all dead limbs should be removed.

JANUARY MEETING.

A meeting of the Society was held at the residence of Capt. FULLER, January 22, 1877. The President, having called the meeting to order, stated that he had invited Judge LANPHERE to be present and read a paper before the Society.

Judge LANPHERE, being introduced, said: "I find myself to-night surrounded by people who have very beautiful grounds, much finer than my own, and my appearance here looks very much like 'calling upon the weak to confound the wise.'" He then read as follows:

SOME THOUGHTS ON PARKS IN GENERAL, AND OUR PARKS IN PARTICULAR.

What is a park? Webster defines it thus: "A large piece of ground inclosed and privileged for wild beasts of chase." That is not the kind of park I have in mind; and yet, the park under consideration is often

infested by wild beasts, as many of our citizens have learned to their sorrow. The above definition is too ancient by half. In more modern times, the word park conveys a very different idea to the mind. It is perhaps easier to tell what a park is *not*, than what it *is*. It is not a forest, nor a meadow, nor a hill, valley or running stream. It is a perfect landscape on a limited scale. It is a combination of beauties, and the greater the number and variety of these, within certain limits, the more perfect is the park. Hills and valleys, running brooks, waterfalls—not those worn on the head—trees, shrubbery, flower beds, fountains, statuary, and, above all, smooth green lawns, are each and all elements that go to make up the perfect park. The "human face divine," to be beautiful, must have variety. Rosy cheeks are beautiful; but who can admire a face "all rose." There needs to be the sparkling eye, the arched eyebrow, the prominent nose, the pearly teeth, the dimpled chin, the cherry-red lips, and the "wealth of hair," to make up the head of beauty.

The leading idea of a park is beauty, not utility. Of course, in large and densely populated cities, like New York, Boston or London, the idea of utility, in the form of health giving, enters largely into consideration; but in our Western world, where room is abundant and cheap, where our cities are made up of magnificent distances, people do not have to resort to the park to get a breath of pure air. We have this richest of Heaven's blessings all around us, and sometimes imagine we could get along with a little less than the supply on hand. Hence, with us, the leading thought in the make-up of the park is beauty; beauty to please the eye, and cultivate the taste. "A thing of beauty is a joy forever." Beauty, then, being the leading object, none but beautiful objects, or objects which by their variety or position go to make up the beautiful, should be permitted a place in our parks. If trees *as* trees are employed, they should be symmetrical in form, neat, and rich in foliage. If they are used to form clumps, beauty of form is not so essential, and yet it is not every variety of tree that can add beauty to a clump. Utility is not to be discarded, if it is accompanied by the essential requisite—beauty; hence, a tree that is both beautiful and shady, is sometimes, not always, to be preferred.

The word shade reminds me that, to use a medical expression, there are two things in this connection that are incompatible—shade and lawn. They cannot exist together—a fact too often overlooked by those who are attempting to ornament their grounds.

Several of the important elements that go to make up the perfect park we cannot have, such as hills, valleys, waterfalls and running brooks; hence the necessity of greater care in selecting the objects within our reach.

The first of all requisites is a smooth, green, velvety lawn. In more senses than one, it is the foundation of a park. When the eye wearies of its pleasant labor of taking in the other objects, it rests with pleasure upon the green lawn. But the lawn is but one of the many elements of a perfect park. The next object, and that which is scarcely second in importance to the lawn, is the tree, with its varied form and

color and function. In fact, considering its many good qualities, it is a close question whether it is not the first in importance in the make-up of the park. The human form is said to be the noblest object on earth; and well it may be, as it is made in the likeness and image of God; and the tree, all things considered, seems to approach nearest this paragon of creation. A park without trees would be like a face without nose, eyes or lips. And right here begins the trouble. We must have both trees and lawn, and the great problem is to determine correctly the due proportion of each. The trees must not encroach upon the lawn, nor the lawn upon the trees; and the trees must be of the proper kind, and each must be in its proper place, not only that each may be seen to the best advantage, but that each in combination, or by contrast with other objects, may reflect most beauty upon all. I am fully aware that, when I touch upon the subject of trees, I am on delicate, if not holy ground. Shade, the cooling shade in the sultry noontide, with the gentle winds fanning the burning brow, is *delightful*. It is the next best thing to a sherry cobbler, or rather a lemonade with a straw in it; and there are those who, when you mention a park, can think of nothing but the burning brow, the sombre shade, the whispering winds and the sherry cobbler, or rather a lemonade with the straw in it. But sultry suns and sweltering days do not make up the whole of life; if they did, perhaps the sooner we betook ourselves to the caves and ice-houses the better. If the object is shade, have a forest at once; but do not misname it by calling it a park.

But the great question is, what kind of trees shall be planted? And this question must be met. Nothing will be gained by dodging it, or approaching it sideways, or by a flank movement. The enemy cannot be thrown off his guard by any such strategy, so let us meet it squarely, and at once. I hate a soft maple. It is a sprawling, misshapen, rickety thing. It has neither beauty nor durability—which is perhaps its highest recommendation—nor freedom from insects, nor is it good for shade or firewood. It is "neither fish, flesh, nor good red herring." It is said in its behalf that it grows rapidly; and so does the toadstool, and thistles, and bad habits; and who cares to cultivate these? Let us away with it; for while we have the soft maple we can have nothing better. We have a great variety of trees, "native, to the manor born," beautiful in shape, rich in foliage, healthy, neat, and free, or comparatively free, from insects. Why cumber the ground with the worthless, unsightly soft maple? The elm has some beauty, is healthy, and grows to a good old age. It lives long enough to become a landmark, and to be loved for its associations. But its chief merit, with many, is its rapid growth. In this it is in keeping with the times. The fault of the age is haste—haste in everything: haste to enjoy; "haste to the wedding," which is all very well; haste to be rich. The cry is, "Let the golden stream be quick and violent." Now, do we ever stop to consider that *time* is the chief factor in all excellence; that excellence is in proportion to the time expended in its production. The finest works of art have exhausted a lifetime. The richest gems have in all probability required millions of years for

their formation. Wine must have age. It is only the flimsy, the evanescent and the short-lived that is the product of haste. The cottonwood grows very fast, has a better form and a richer leaf than the soft maple, and yet who would think of planting more than one or two as samples, and to give variety in a park? Among the trees that should find a place in a park in our latitude, *provided the grounds are sufficiently extensive,* are the hard maple, the ash, the linn, the horse and common chestnut, box elder, sycamore, red oak, pecan, birches, beeches, aspens, catalpa, tulip, buckeye and magnolia, besides the great variety of evergreens. The number, including the different varieties, is legion. To these, of course, is to be added the many varieties of shrubbery. But our grounds are limited. If we had four or five hundred acres, instead of six or eight, we might indulge our tastes and preferences in the number and variety of the trees. As it is, only a very few can have place on the grounds, if we are to have any lawn, flower beds and shrubbery; in other words, if we are to have a *park.*

In view, then, of the limited space, and, consequently, the limited number of trees that can be planted, what folly to plant anything but the *best;* and what supreme folly to permit trees to remain in the park that *must* ultimately be removed to give place to the permanent denizens, and thereby indefinitely postpone the very beginning of a park—the planting of trees!

I confess to a liking for the linn or basswood. True, we sometimes use the word "basswood" as a term of reproach, or of contempt, or to belittle the object to which it is applied. We have "basswood cheese," and "basswood men," but the tree suffers more than the cheese or the men by the comparison. The term seems to signify something too yielding, soft, or tasteless; something "stale, flat and unprofitable," and is nearly the opposite of the expressions, "hearts of oak," "old hickory," "rock-ribbed" and "ironsides." But while the wood of the linn is soft and pliant, it is at the same time *tough*, and, above all, the tree, when permitted to grow at its own sweet will, is beautiful in form, rich in foliage, and its blossoms are exceedingly fragrant. It should be kept in mind that, in the choice of trees for a park, beauty is the leading object. Of course, durability, neatness, health, and freedom from insects, are important qualities not to be overlooked.

The flower bed is an essential element in the make-up of the park; it is the rose upon the cheek; and yet it should bear but a small proportion to the green lawn, the emerald setting, that surmounts it. A rose bush is far more beautiful with a wealth of rich green leaves and a few choice flowers than when covered over with blooms. *All* sweet surfeits. The green leaf serves as a foil, and, by contrast, renders the flower more beautiful; as the fashionable dames, of our grandmothers' time, wore black patches on their faces to enhance their beauty. Upon this principle, it might do to retain one or two soft maples as patches on the face of the park; but let it be remembered that no face, however beautiful, could stand more than one patch.

One word in behalf of the hard maple and horse chestnut, the most beautiful of trees grown in this climate, but, alas! the slowest in growth.

And here lies the rub. We dislike to plant unless *we* are certain to enjoy. We are selfish; we plant for ourselves; we do not plant for posterity. What care we for the future? How unlike, in this respect, to our ancestors of Old England. And yet we boast of progress in morals, patriotism and in the humanities; as if there could be such progress while retaining, in all its fullness, our native selfishness. Unless the beauty charms *our* eyes, and the cooling shade delights *our* senses, we grudge every moment and every cent devoted to its production. Let us take on a little public spirit; let us "assume a virtue, though we have it not;" let us do something for the coming generations; let us lay the foundation of a beautiful park, although our children's children only may enjoy the blessing in its fullness.

An interesting discussion followed the reading of this paper, in which Messrs. Comstock, Dieterich, Hale, Lanphere, Bateman, Weaver, Humphrey, Hunt and Arnold engaged, which, for want of space, we are obliged to omit.

MARCH MEETING.

At a meeting of this Society, held at the residence of T. J. Hale, March 6, 1877, Prof. Standish submitted the following report, which was ordered to be included in this report:

REPORT OF THE MEETING OF THE STATE HORTICULTURAL SOCIETY, HELD IN GALESBURG, DECEMBER, 1876.

Having been appointed to represent this Society, on all proper occasions and at all proper times, during the meeting of the State Horticultural Society recently held in this city, I would beg leave to submit the following:

The State Society met, according to previous announcement, Tuesday, December 12th, at 10 o'clock, A. M., in a hall in the Union Hotel, selected for that purpose. The hall, it seems to me, was not a suitable one for such an occasion. It was secluded and unknown, even to our own people. There were instances of persons making an attempt to attend the meetings, but were unable to find the hall. For all such gatherings a central location is preferable, and generally meetings held in by-places prove to be failures. Do I mean by this that the meeting of the State Horticultural Society here was a failure? By no means. In very many respects it was a success. In other respects it might have been better.

The reports of the different committees on General Horticulture for the different districts throughout the State were highly interesting and instructive. The successes and failures of the past season in fruit culture

and in the raising of cereals were brought, so to speak, face to face. If the apple crop was a failure, if small fruits were not abundant, if corn, wheat and other grains yielded poorly, or if a great abundance crowned the efforts of the husbandman, the causes thereof usually were revealed in their reports and discussions.

The report of the Committee on Horticulture, in its relations to insect depredations, was valuable, and one that should be read by all agriculturists. The farmer has no greater enemy to his success and prosperity than the insect tribe. In the United States millions of property every year are destroyed by this countless army. In some States and districts almost every living thing of the vegetable kind is destroyed. The grasshopper pest of Kansas comes like the besom of destruction, and the hopes of the husbandman are blasted and gone. Surrounded with this innumerable army of enemies, the life of the farmer becomes a struggle for existence. Among the insect tribe, then, it behooves us to know our enemies and our friends—our enemies, that we may guard against them; our friends, that we may make use of their friendship.

I cannot speak in too high terms of praise of the report of the Committee on Ornithology, by Prof. Forbes. Prof. Forbes has entered upon a work of paramount interest and profit to the practical horticulturist. His work is the analysis of the contents of the crops of the different kinds of birds, in order to ascertain whether they are beneficial or injurious to the husbandman. This labor is not confined to a single bird for a single day, but it extends through the summer months. A scale of marking is adopted similar to one used in our schools and colleges. The scale ranges from 0 to 100. On examination of the crops of birds, if nothing but injurious insects is found, the bird's standing is 100; if nothing but fruits, the bird has a discredit indicated by *zero*. I might add here that the work of Prof. Forbes is not the work of a day or a year. He proposes to extend it through a series of years, in order to obtain certain and definite results. To that end, he has, at present, preserved in alcohol, thousands of birds' crops, waiting for examination. These have been sent him from different parts of our State by friends interested in the work.

The Committee on Geology submitted an interesting and instructive report, through Prof. Worthen. The geology of our State must always be worthy of the attention of the tillers of the soil, because it is more or less connected with the art of husbandry. The kinds and position of the different strata have much to do with the matter of drainage, or the *power* of the soil to withstand drouth. In this paper, Prof. Worthen has proved himself a master. He is truly deserving the support and confidence of the people of the State.

One thing especially was to be noticed with regret—the failure of those whose names appeared upon the programme to perform the part assigned them. Those who are given any public position, and who have accepted that position, should not disappoint the people by their indifference or non-attendance. There is no doubt, however, that many were kept away by circumstances over which they had no control. But it is

with unfeigned regret that I noticed the absence of Prof. Turner, of Jacksonville; Prof. Riley, State Entomologist of Missouri; Dr. Gregory, of Champaign; Prof. Tice, of St. Louis; Prof. Burrill, of Champaign, etc., etc. These are representative men, and, if they had been present, would have added much to the pleasure and interest of the meeting. To compensate in a measure for these failures, I am told that these gentlemen will furnish valuable papers to be published in the Report of the State Horticultural Society.

The twenty-first annual meeting of the Illinois State Horticultural Society marks an important epoch in its history. It has done much for our Prairie State. Much yet remains to be done. It came into being when this Garden of the West was almost an unbroken wilderness. From Freeport to Cairo, from Lake Mighigan to the Father of Waters, scarcely was there a trace of civilization. Here and there the smoke curled from the farmer's cot, giving evidence that the wild beasts had been frightened from our borders, and that the Indian camp-fires had gone out and that the war-whoop had ceased. To-day we are in the midst of grand improvements, surrounded by the richest blessings that Heaven ever vouchsafed to any people. And as the rolling years shall come, each laden with new life, new hopes, new aspirations, so may the State Horticultural Society renew its life and vigor, giving us a foretaste of the useful in the beautiful, and the beautiful in the useful.

J. V. N. STANDISH.

Alton Horticultural Society.

REPORTED BY E. HOLLISTER.

OFFICERS FOR 1876.

President—James E. Starr.
Secretary—O. L. Barler.
Treasurer—D. Stewart.

FEBRUARY MEETING.

The Alton Horticultural Society met February 3d, at the residence of Mr. J. L. Blair, in Alton. The day was stormy, but it did not deter our horticultural workers from coming out in force. Our President rode eleven miles through the storm, and was on hand promptly at ten o'clock. Mr. Riehl came eight miles through the heavy snow storm, and, to his credit, brought his wife. A number of other ladies were present; and altogether, we have seldom had a more satisfactory meeting.

ON ORCHARDS.

The discussion on this subject revealed the fact that the fruit buds are all right to date.

Mr. Hollister said that now, and onward, was the time to prune both peach and apple trees for fruit. I do not like the practice of pruning from the bottom up, as I see some doing. I prefer to prung from the top down.

O. L. Barler—The idea is, to study to prune as little as possible.

Mr. Hollister—I would be shy about cutting large limbs. Heavy pruning is not good at any time.

Mr. Hayden—The idea prevails that there is no money in keeping fruit for high prices, because of the loss by decay and rot. Now, I have some facts on this subject which ought to be of interest to apple growers. I am told by my commission merchant in Chicago that they buy up in the fall all the apples they have money to buy, at about $2.00 per barrel. They store them in one of the Chicago fruit-houses till spring, paying a small price for storage, and they come out in the spring with small loss, and are sold as high as $10.00 per barrel. It seems to me there is some opening here for apple men.

Mr. Stewart—Mr. Benson, here, has experience in keeping apples, I would like to hear from him.

Mr. Benson—I keep apples for the spring market, and have usually received from $4.25 to $8.00 per barrel.

Mr. Hollister—Apples are keeping this year better than usual. The idea of holding for large prices may do, but only in limited quantities, and when you have packed your own fruit and know what it is. My experience in former years has been satisfactory. But the markets are changing. Our market now is South, rather than North; but the South now is full of Eastern apples, and our time has not yet come. It is yet too early to sell our apples in that market. We have now a brisk competition from the East, and besides, the demand is for a better quality of apples.

VINEYARDS.

Mr. Hayden—I have a few words to say in regard to the prospects of vineyardists in this locality. In the southern part of this State many have grubbed up their vines, and north of us the crops fail. A gentleman from Warsaw told me that their vineyards did not bear well. We also know that Missouri is complaining of rot. I think, from these scraps of information, we may draw the conclusion that, right here about Alton we are peculiarly and favorably situated for growing grapes. We are free from rot, almost entirely, and our vineyards are in good condition and bear well. So I think we may hope that grape-growing will pay even better than in the past. Mr. Hayden explained that he thought he had been, on former occasions, misunderstood in regard to attempting to grow too many grapes on a vine. While he had found almost no limit to the quantity which a vigorous, healthy Concord vine would bear, still he conceded that it was the greatest folly to tax a vine that ought not to

bear a pound with the task of ten pounds. He could not tell any one how to trim, but he could go into the vineyard and show how to trim. He trimmed according to the strength and vigor of his vines, as George Husman would say, "judgmatically."

Mr. Riehl named new varieties—Neosho, Elvira and Lady Grape—as varieties worthy of trial.

Mr. Hollister discoursed on the question—

WHAT SHALL I PLANT?

This question is now again of vital importance to the horticulturist, and is one that will remain open. It will never be answered. And if what I may offer in a few practical suggestions shall be of service to any, my object will have been accomplished.

The amateur, the farmer, the market gardener, the thrifty housewife, all ask, "What shall I plant?" The answer must differ, as to condition and wants of each, and it is beyond my purpose to-day to reply to more than a few items in the line of the market gardener. In this locality the demands are for retailing to the city, and shipping to northern or other markets; both of these are growing more fastidious in their selections, and require the very best and earliest. The conditions being given, it follows that to succeed you must have appliances for thorough and economical managing of hot-beds through the winter, together with varieties of vegetables best suited to the wants of the trade; both of these require personal and practical attention. Volumes have been, and might be, written on such subjects, not but that it has become somewhat monotonous, yet I think the human mind is so constituted as to require "line upon line, precept upon precept, here a little and there a little."

In our list we begin with lettuce. Probably not less than a thousand hot-bed sash are used in growing this vegetable alone; never less than two, and sometimes three, crops to each sash. The variety grown here is undoubtedly of the Silesia family, yet of a distinct and very superior strain, which has obtained its high reputation from careful selection of seed, for the past twenty years, and is now distinct, and one of the best for cultivation under glass. The quality is excellent, and, when well grown, makes quite an effort at heading up.

Some have tried the Hanson lettuce, and think it quite an acquisition. The large size of its heads, and exceedingly crisp and tender leaves, place it among the most desirable, at least for city retail trade. "A word to the wise is sufficient."

Radishes are almost as staple an article as lettuce, and no one variety has been so much planted as the Long Scarlet Short-top. When completely grown long, as this name indicates, with short tops, they are beautiful to look at, and much to be desired.

A new competitor for favor has reached us the last two or three years, and Wood's early frame radish bids fair to supply a want for a first-rate, quick-maturing radish under glass.

While these crops have been coming in, your cabbage and tomato plants have been started at the right time, and of all varieties of cabbage you put in, you have not neglected for earliest the Early Jersey Wakefield, and for second early, the "Fottler's Improved Drumhead," or some other good and well-tried variety. It is too late now, to make a success, to sow the seed for the earliest. As to tomatoes, whatever early variety you try, do not neglect Trophy for main crop. Though not so fine and large as this variety, the Tilden is the earliest of the large tomatoes. Several new aspirants to favor are out, and may be tried. The Canada Victor, or the Conqueror, may prove to be what we want. For the early home market, Hathaway's Excelsior is one of the best, round and smooth; it ripens up thoroughly, and is of excellent flavor.

Cucumbers, to be early, are started and grown under glass. For this purpose, the white spine stands almost without a rival. The New Jersey hybrid is larger, not quite so early, does well, and bears enormous crops. To have all of these to perfection, get the purest and best seed to be found. The smaller price, as compared with quality of seed, is dearest in the end; therefore, spare no pains or expense to obtain the choicest. In this direction, let me urge upon you to save your own seed carefully and systematically; select the earliest and best for yourself. Let no flaming advertisements draw you from this purpose. Your reward is certain; your seed will grow; your plants will be true to name, and your crops will pay.

Follow these suggestions, and you will then always know what to plant.

MARCH MEETING.

The March meeting of this Society was held at Crowe's Hall, in Alton, on the 2d inst.

Col. Fulkerson (of Jerseyville) inquired as to the best time to set fruit trees.

MR. RIEHL—I think fall best, but spring is good, and if ready to set them, would not wait till fall.

COL. FULKERSON said he had a fire run through a part of his orchard, and supposing the trees dead, dug them up.

MR. RIEHL thought he would have done better to let them stand, as they would sprout at the ground and make a tree quicker than in any other way. Others thought that if the burning was not severe, the tree would have made the connection and out-lived the damage.

MR. HAYDEN exhibited a handful of peach buds all right yet; but considerable fear is had that they will not stand the usual freezes of March weather. A few days of warm sun will put the peach trees in full bloom. In some localities, the early Crawford variety is seriously injured, but all other varieties have sufficient buds for a full crop.

MR. HOLLISTER presented the request of a man at Shipman, asking for the best varieties of sweet cherries, particularly the earliest sweet cherry.

MR. RIEHL advised the gentleman to let sweet cherries alone in the locality of Shipman.

The varieties named were, Knight's Early Black, Governor Wood, Yellow Spanish and Elton. Others were named, but it was thought that these would bring disappointment enough.

MR. HAYDEN had some encouraging words in favor of the Wild Goose plum, providing it could be got true to name; whereupon a general discussion upon plum culture followed, showing a diversity of opinion as to varieties and profits that was remarkable.

MR. DRAPER and others considered the Chickasaws the only varieties of plums that could be grown with profit in his locality. He questioned if that was not the fact generally.

MR. RIEHL argued that if a man was going into plum-growing, he had better get the choicest varieties, and prepare to take care of them. If he will do this, and run the curculio catcher, he will find profit in plum-growing—not otherwise. He thought it was a mistaken notion that the curculio did not work on the Chickasaw plum. The fact is, the depredations of the insect are not obvious, because of the abundant crop.

MR. STEWART wanted to know how Mr. Riehl managed to catch the curculio. He had never seen a tree upon which the curculio catcher was run that was not injured.

MR. RIEHL—The gentleman asks how I catch curculios. He says he has never seen a tree upon which the curculio catcher has been run that was healthy. If he will come to my place, I will show him trees from which I have taken the curculio for two years, and I will defy him to find any injury therefrom upon the trees. We no longer run the old wheelbarrow curculio catcher. All that is needed to jar down the insect is a mallet, covered with a double thickness of sheepskin. A sudden tap on the body and limbs of a tree leads the insect to suppose that a bird is near, ready to gobble him up, and he instantly drops and is caught on the sheet.

MR. STEWART thought a sudden shake of the tree would bring down the "little turk," and was preferable to the mallet.

MR. RIEHL thought not. The sheepskin-covered mallet was the thing.

MR. STEWART thought the Little Damson the most profitable plum. It would sell for more than the Chickasaw.

DR. LONG inquired why he spoke of the Little Damson. He thought there was but one variety of the Damson.

MR. STEWART—I have seen what I call two varieties of Damson plums—one large and the other small.

The Doctor thought cultivation made the difference in size.

MR. HOLLISTER did not see a great deal of money in plums of the Chickasaw family. When other fruit is plenty they sell for little or nothing, and last year it was really difficult to get perfect plums—plums that were not injured by the curculio.

QUINCES.

MR. STEWART spoke of the quince as one of the neglected fruits that was worthy of cultivation, for the money and the good that was in it.

COL. FULKERSON inquired particularly about the cultivation of the quince.

DR. LONG recommended a moist situation, western exposure, on ground a little shaded. He did not find the growing of quinces for market profitable, but for jelly they were good—nothing better. But if you want them in perfection, they must be ripe, and then they are not suitable to carry to market without injury.

The idea of growing quinces, or anything, in the shade of something else provoked the indignation of MR. RIEHL, and he let out on the Doctor

in brilliant style. Mulch and culture are the things that give moisture, and not shade. The Doctor retorted that currants and some other fruits did better in the shade than anywhere else.

According to his experience, MR. BENSEN had found the quince profitable. So said friend HAYDEN and others.

UTILIZING OF FRUITS.

A letter was read from THOS. LESLIE, of Ipavia, Ill., that attracted some attention, upon the subject of the Utilizing of Fruits. Mr. Leslie is a practical worker in this line, and gave statistics as to outlay in running a canning and drying establishment. Any man with capital engaging in this business would receive the hearty co-operation of all fruit-growers in this district. Such an enterprise will be undertaken and successfully prosecuted some day. It is only a question of time.

The subject of Culinary Vegetables was discussed by Capt. HOLLISTER and others.

SMALL FRUITS

Were discussed briefly by Messrs. STEWART, HAYDEN, DRAPER and others.

MR. HAYDEN inquired about Downer's Prolific and Kentucky.

MR. RIEHL said they were not prolific enough.

MR. HOLLISTER said he was not satisfied with the trial he had given them. He thought the Jecunda more promising than the Kentucky.

After dinner, MR. HOLLISTER read the following essay from Hon. JNO. M. PEARSON, of Godfrey, on

ORNAMENTAL PLANTING.

Mr. President: I see, by the programme, that I am still on the Committee on Ornamental Planting. Why so inconstant, never-to-be-depended-on member, as I have been for the past three years, was appointed to so important a trust I cannot tell; but lest the Society, in the exercise of those modern vices, "spasmodic retrenchment and reform," should abolish the committee, I'll e'en just speak a word before.

It is none too soon, I know, for this is the time of all the year when planters must be most busy. Such weather as we have had the past month might well have been improved, if our plants, trees and shrubs had only to be moved short distances. I find it a little difficult to stick closely to my subject of ornamental planting, in distinction from any other kind of planting. Of course, there is much in common. There is, however, this difference: before we can commence our work we must use our brains a little; whereas, the farmer who owns a quarter section, and means to

plant one hundred and sixty acres in corn, need not hesitate much as to when to begin or what to do first, or stop to consider how it will all look by and by. But we must think, first, of what we wish to accomplish, and next, what means are in our possession. Each particular case must, in a measure, furnish a particular answer; but, in general terms, I may say that, by "ornamental planting," we mean to express the thought so clearly as to strike the beholder that "man lives not by bread alone." Our work brings no dollars to the pocket, but may bring content to the heart. I believe the above, in a general way, covers the case, and if we would all work a year or two, with only this end in view, we would improve the looks of our homes very much. But, in the meantime, we might go hungry (this last remark doesn't belong to my subject) now for means in our hands with which to work out all the beauties of nature and place them where we can enjoy them. Trees and grass are the great agencies with which to work wonders. "Common," do you say they are? So much the better for you and me.

In planting for ornamental purposes, do not try for immediate effects. Keep in mind what the effect will be when years have passed. You can enjoy more in watching a thing grow and develop under your hand than in buying ready-made, or in working out your full plan all at once. This is the natural way, and it is only "shoddy" people who try to ape the natural by clumsy artifice. God makes us wait for most of our good things, real or fancied, and our own judgment approves His wisdom. None of us would wish our children to be born to us old men, or even old maids. Oh, it is splendid, from year to year, to watch a tree grow and spread out its limbs, and think that so many years since you pruned it with your thumb nail when it didn't reach to your chin, and now it is as high as the eaves, and will be higher and higher, growing on, on, years after we are gone. In this art of ours, which "doth strive to mend nature," let us try and possess some of nature's patience.

We may do as my friend Mr. Hollister says he does, raise a crop of potatoes on the same ground as will next year bring strawberries; so we may grow some pretty little things while our grander things, of slower growth, are coming on.

The great difficulty about our work is this: all of us, who try at all, try our best at ornamentation near our dwellings. I have often thought what beautiful places could easily be if one could only get rid of the houses and the barns, and the sleds and the fences. We try hardest for the beautiful under the most untoward circumstances. I can, to-day, make my pastures far more ornamental than any house lot, and with less trouble. Our homes, etc., as a rule, are ugly, and must be so in the nature of things. "Homely" we call them, and like the name; but you know the word is almost synonymous with ugly, and the facts are quite so. Æsthetic tastes, physical comfort and home joys are not good friends (make a note of this last remark—it's truer than most things I have written). I'll illustrate this: I visit a friend sometimes, whose home appointments are perfect, so far as neatness, order, economy of time and labor, and care for one's family and friends can make them. The kitchen garden is, in

its season, suggestive of good things, which the good wife never spoils in cooking. The orchard is full of promise; the horses, cattle, sheep and poultry are beautiful and beautifully cared for; even the lazy pigs, in spite of their reputation, are busy getting fat for their owner's use. The preserving, canning, pickling, drying, curing and salting (I had almost said brewing) are admirable.

"Sixteen barrels of cider
Ripening all in a row,"

Make the cellar foundation broad and deep for good cheer. This is the man's home as he has wrought it out, and it looks well in his eyes. He has impressed himself upon the landscape successfully. I tell this friend of mine, "You must plant something ornamental." He says, "What do you wish to see better looking than that half mile of osage hedge on my north line, so thick that a rabbit can't get through? And if you know a better apple in January than Pryor's Red I'll plant it, and be glad, too. There's plenty of trees in the woods; and as for flowers, I don't want to see anything finer than the violets, anemones and spring beauties that grow on the warm side of that fence every May. Dogwood, redbud, locusts and apple blossoms are fine things enough for me, and we've plenty of them. Later in the season a field of red clover pleases my eye and delights my nose—nothing smells sweeter, except that same clover after it is cut and cured, and in the barn without a drop of rain on it; and on the last point all the cows agree, and so will you when you eat the butter."

Ahem! Yes! Well! I am afraid I shan't succeed with this man; he is content; his farm, his wife, his children, his all are, in his eyes, as the world was when the Lord first made it—"very good." No show or parade; nothing done for others' eyes; no care if others find fault. Suggest some of the simplest ways of beautifying home; tell of a lawn well kept, shade trees, shrubbery, pleasant walks and shady seats, all giving an air of repose and quiet elegance, then listen to the answer: "'T would look as if nobody lived here, and what should I do with the sheds and piles of rails and pens of lumber it is so handy to have here? Where shall I put the cider-mill and the smoke-house, the coops for little chickens and the barrels where the old hens lay and hatch, and mash tubs, and the troughs and tubs for ducks and goslings? You'll want me to move my old wagons, and racks, and barrows, and sleds, all out of sight, as if I was ashamed of them. Beg your pardon, but if it's all the some to you, I'd rather not."

My friend has eyes only for the things next him. What you or I would put out of sight, and by skillful planning cover up, he prefers should not be covered up; in fact, he feels rather proud that the evidence of thrift and creature-comfort should be patent to all. You can't convince this man; but the town peddler (bless his heart) will sell him a big bill of stuff every year, to be yearly wasted and lost by the wife and children, who do want they know not what, and "don't know how to get it." Next year, among the cabbage and other garden truck, we will see a few mari-

golds, pansies, zenias, four-o'clocks, and balsams, fighting for life, in the only place on the farm protected from the hens and turkeys. These are the homes that have never heard of the gospel of trees and grass. We must preach, and not ignore the little, bright things called flowers. We need them, as the painters say, just "to hang a little warm color on;" nor the shrubs that, once set, do their duty year after year almost without our care. Do you want a list? I can give it. Let all the Society suggest, and if the Secretary will note it down, you'll have a good one, perhaps better than I can give. One word and I am done. Do something; plant a tree, a shrub, a flower, a plat of grass, and care for it, and do it without thought of any return of money, and you are then in the right way.

THE APRIL MEETING.

The April meeting of the Alton Horticultural Society was held on the 6th inst., in Crowe's Hall, Alton.

The first business, in the regular order, was a report from the Committee on

ORCHARDS.

A singular sadness fell upon our hearts as we were reminded that the familiar voice of this Committee will never again be heard in our horticultural councils; and, while each in his own mind was meditating on the mysterious Providence that calls away suddenly the most useful and hopeful among us, and leaves behind those who could, seemingly, be spared, President STARR formally announced the death of JONATHAN HUGGINS, of Woodburn. He said: It becomes my painful duty to announce to you the fact that death has again entered our circle, etc., for the fourth time in twelve months, taking from us a most active and gifted member of our horticultural organization.

It seems needless for me, at this time, to enter into any lengthy statement of the virtues and noble qualities that recommend and endear to us our friend, Mr. Huggins. We all know his zeal and devotion in horticulture. He seemed in the full vigor of manhood, with hopes and promises of usefulness not yet filled up. He met with us regularly, or at brief intervals, for very many years. No one amongst us has traveled further, or overcome greater difficulties, to sustain our meetings, than our lamented friend, Jonathan Huggins. But he has gone from us. It is not my purpose to make further remarks at this time. It is remarkable that we should be called upon to mourn the loss of four such prominent workers as Mr. and Mrs. Hull, and Messrs. Starr and Huggins, and all

within one year. I will say no more, but leave it with you to adopt suitable resolutions in respect for the dead and in sympathy for the bereaved family.

G. W. Hilliard (of Brighton) was appointed Committee on Orchards, to fill the vacancy caused by the death of Mr. Huggins.

The subject of pruning the apple orchard was again revived, in which Messrs. Snedecker, Hilliard, Starr, Long and others took part. The prevailing feeling was that some pruning was necessary, but that the danger was pruning too much.

There was an interesting discussion upon the orchard, which cannot be given, as it would make this report entirely too long.

Mr. Hollister presented the following, on

HOT-BEDS, AND HOW TO USE THEM.

No horticulturist can do without them. To attempt to make vegetables for the home or distant market without them, is equivalent to no profit in the business. Hence, to have such hot-beds as will prove the best in all circumstances is a proposition none will gainsay.

The present winter, "lingering in the lap of spring," has been the most trying in the use of hot-beds within our experience, and failure and serious loss are already written to the debit of profit and loss account.

In the usual manner of constructing hot-beds with fermenting manure, and their use, the drawbacks have been more serious than common, notwithstanding we have had so mild a winter, up to March 1st. Previous to that time it was plain sailing and fair success. Since that time, however, the excessive amount of rain and snow has flooded these beds so much as to destroy, to a great extent, the heating power, and create a condition of things unfavorable to plant-growth, and very favorable to insect and fungoid growth.

Many lettuce and tomato plants have been lost—the effects of the long, dark and continued dampness—notwithstanding the most skillful experience to prevent disaster. We are led to ask, What is the remedy?

Our experiences are worth but little if they do not cause us to inquire what we can do, and we cast about us anxiously for some better way.

To begin, then. If we must use manure hot-beds, there must be good drainage. The surface water must be carried off more rapidly, or we shall always fail when such seasons come. The construction of such beds, especially for tender plants, must be more carefully attended to; the manure should be more thoroughly mixed and turned over before making the bed, and about a cart-load of sawdust, already treated, should be mixed with the other material for each bed. Boards should be so placed on the lining around the bed as to shed the water from the bed all around, and the boards to cover should be sufficient to extend over the whole bed, and so arranged as to carry the water away to the best advantage. These few suggestions, if heeded, will save from much "vexation of spirit."

There is another, and, as the writer believes, a better way. Hot-beds constructed so as to use fire as a heater will prove far more reliable, and at least no more expensive. My own beds, constructed with common drain tile or flues, have worked admirably, and some of the advantages I find to be briefly these: When the warm days come, which we often have during our winters, the fire can be discontinued and the beds aired, watered and worked, with impunity; the heat, as from a manure bed, is not escaping and going to waste, but you are saving your fuel against another spell of cold weather.

Then the tendency of such beds is to be dryer, and, consequently, more healthy for plants and vegetables. With such beds, all the board covering, which I only use for tender plants, may be removed daily, unless stormy, and thus admit light, so essential during protracted dark or stormy weather. Never a day, all winter, except when storming, but my hot-beds have been so treated, and daily ventilated, preventing drawn and sickly plants and promoting growth.

Another great advantage in the use of fire hot-beds: Lettuce, radishes, pie-plant and such, as also cabbage plants, may be grown without any other covering than the glass. I would except severe cold, strong winds, snow and hail storms. Yet my beds have had no other covering than glass, except tomato, cucumber plants, and the like. The market gardener can appreciate the saving of labor in this item, as the regular daily handling to cover and uncover with boards is a heavy tax.

Dr. B. F. Long read a paper on his

HORTICULTURAL EXPERIENCE.

Mr. President: I have been requested to present you a statement of my horticultural experience. I can only give a brief review of my labors, part of which is taken from memoranda, but most from recollection. In boyhood, I had a desire to change the character of the fruit of old trees growing in my father's orchard, and having been told that the secret of success in making "grafts grow" was the nice adjustment of the inner bark of the cion to the inner bark of the stalk, and protecting them by a clay composition, I went to work upon these principles, and succeeded very well, using up quantities of old woolen rags and tow strings for confining the composition to the stalks and lower portion of the graft. At length, wax composition was discovered, but it was kept a secret for many years, and used only by those who paid for it. With this discovery commenced a rapid improvement in fruit-growing, and change in the quality of the fruit raised. The unsightly clay daubs upon the cut limbs gave place to the neat dressing of plaster, and the success of growing the cions was in favor of the latter course. From the commencement of this improvement there seemed to spring up new life in fruit-growing, and "well to do" persons were not wanting, in most localities, who, having obtained the secret of compounding the "grafting wax," offered themselves to graft old orchards at a certain price for the grafts that grew.

Slow was the progress of making new heads to old trees, and slower still the growing of new ones in the stony and unfertile soil of New England. In those early days, the best of seedling apples were worth twenty-five cents per bushel; improved fruit, from twenty-five to forty cents. These prices continued to as late a period as 1831 (when I left that region for the West), and the farmers seemed satisfied. Cider was worth seventy-five cents to one dollar per barrel of thirty-two gallons. I speak of this part of the farmer's business rather as a matter of encouragement to those engaged in tilling the soil of Illinois, and particularly of our region. The idea that I wish to be considered prominent is the facility of raising trees and the worth of fruit here. In the East, ground was prepared and trees planted at a great outlay, and a season of from eight to twelve years' growth from the graft to the bearing period, with constant attention, and the price of fruit (selected) as above. Here we plant our trees, one or two years from the graft, in land ready to receive them while in the natural state, which may then be cultivated with profitable cereal or root crops, the proceeds of which will repay all the expenses of culture, and in four to six years we may expect the fruit of our labor from the trees, and a fair remunerative price in market for our surplusage, and, as in the East, we may expect prices to continue about the same. Hence, we see the cultivation and success are in our favor, difference being attributable to soil and climate, New England being too far north, while Southern Illinois, geographically, is well situated for the apple crop. Great improvements have been made in the culture of the apple, and still there is room for advancement. There has been enough said on cultivating the tree to assist any one, who takes pains to improve himself, how to grow an orchard successfully. One fact, however, has been generally unobserved, and that is, seedling trees are much longer-lived than most of engrafted or budded fruit, but less thrifty.

I have planted four orchards of my own, commencing in 1832 and closing in 1848. Of the trees planted in 1832, not one of the Gilpin, August Pippin, American Russet and Spiced Sweeting is now living. Pennock is in a diseased condition, or rather dying with old age, and so of some other kinds. Orchard planted in 1834: most of the Gilpin dead, and decay marks several other kinds, such as those above named, the Newtown Pippin, Pryor's Red, Twenty-ounce Pippin, Rawles' Janet, Roxbury Russet, Rhode Island Greening, etc. Orchard planted in 1839: Gilpin decaying rapidly, Roxbury Russet, and other kinds as above, showing signs of old age. From facts like these I am led to repeat what I have heretofore expressed to you, that every tree has its lifetime, and that though we may prolong that existence for a time, by propagating from it, and giving it additional life by connecting it with a young and vigorous plant, nevertheless the tree is old and stricken in years, and, as the servants of King David sought for him a fair damsel to cherish the King, and minister to him, so we may do in the matter of continuing the life of a tree, but it will be only for a short season; and as his life was only prolonged to choose his successor and give him a charge, so we may propagate the old plant, and continue the excellency of the fruit by

planting its seed. I could refer to other instances in proof of the brief continuance of some of our fine varieties of apples, but shall let them pass, and for the sake of comparison will refer briefly to the life of seedlings that have come under my observation. In 1831 there were several orchards of seedling trees in this vicinity; one on the Abel Moore farm, with trees six to eight inches in diameter; on the John Moore farm trees some of them a foot in diameter, some of which are now in a thrifty condition, and bearing well. One on the Isaac Scarritt farm, near Godfrey, the trees, four to six inches in diameter at the above date, were very thrifty, but were uprooted by the late hurricane that passed through that locality. This orchard was planted about the year 1822. The Moore orchard, as early as 1812 to 1816.

May we not expect the same perfection in apple raising as in that of corn, potatoes and other vegetables, or, to say the least, as in the method of muliplying the varieties of pears after the plan of Van Mons and his co-laborers, by hybridizing; and would it not be well for some of our young fruit men to branch out in this line of operation? I will venture to call your attention to another item in connection with this subject of apple culture, viz.: at what age do apple trees of improved and engrafted fruit cease to return a good profit? I will admit, in the outset, that this varies according to location, manner of cultivation, the age of the tree from which the cion was taken, quality of the soil, etc., but, according to my observation, to a much less extent than one would naturally suppose. Some varieties of apples will come into bearing, culivation having been all right, in four or five years from planting out a two-year-old graft. Others will not produce any fruit under eight to ten years' growth. From this season of fruit bearing they rapidly increase in size and productiveness till they arrive at the age of from fifteen to twenty years. The trees, being young and vigorous, produce fruit of large size, crisp and juicy, and within the reach of the gatherer, so that his crop is gathered with great facility and ease, and when sent to market, finds a ready sale at the highest prices. After this age, the tree rapidly extends its branches, the ascending ones generally predominating and becoming unapproachable for gathering the best apples, while the side branches are loaded with an inferior growth and much damaged by the shade and the insects that infest them. I should say, then, that an orchard is unprofitable when the trees have become so large as to require long ladders for gathering the apples, and they are, from size and other defects, unfit for market. When this state of things happens, but certainly when the trees begin to show signs of old age, whether the limbs are dead or not, set a new orchard on a new plat, and grub up the old one as soon as that begins to bear. As beef and bread, hogs and hominy, are needed for the development of muscle, strength and efficiency in the young man, and the mesmerism of the damsel was for the invigorating of the failing strength and life of King David, so are carbon and potash, lime, sulphates and phosphates to the growth of trees and engrafting to their longevity.

It has been recommended by skillful growers of fruit to replant the same ground, by setting trees in the diagonal spaces of the old trees,

and after awhile take out the old ones. I consider this a great error, averse to scientific and practical knowledge. The tree roots that have spread themselves through the whole area of the site have fed upon the material qualities of the soil that are necessary to form wood and fruit, and at the age of the tree have exhausted these qualities from it, and not merely from the small space around each tree, as many insist. Constant renewal of the tree-food will prolong the profitableness of the orchard, but I would not advise the planting of a new one on the same piece of ground, upon the death of the old one. You might as well expect to raise a succession of ten first-rate crops of timothy hay upon the same plat, without renewing its nourishment, as to succeed with the new trees. My conclusion is, that all kinds of fruit-bearing shrubs, vines and trees, have a lifetime peculiar to themselves, and a profitable producing period, and when it is ascertained that the plant has a near approach to that season, the fulfillment of fruiting, a new beginning is recommended upon a soil well supplied with nutrition, thereby saving a vast amount of expense in supplying food for them.

THE MAY MEETING.

The May meeting of this Society was held at the residence of Capt. STEWART, strawberry king of this district.

ON ORCHARDS.

CAPT. E. HOLLISTER read a paper an the golden mean of pruning an orchard. The two extremes of pruning too much and too little were commented upon. Quotations were made freely from the State Horticultural Society's proceedings, showing the extreme views of fruit-growers upon this subject. The essayist contended that the truth lay between these two extremes. Some pruning was needed, but it was easy to prune to excess.

DR. LONG was called upon to give his views upon this subject. He responded by saying that he had no new views to advance upon the subject. What he had written and said in the Society for years he would still say. He had no new light upon the subject. He would answer any questions that might be presented. He believed that he had learned the A, B and C of growing fruit, especially apples. He believed in planting young trees. He thought here was the error, in planting too large trees. His first planting was made many years ago, of 328 trees. They were one year old, and not one of them died. His second planting was

of 1,132 trees, two years old, and of these he lost but three trees. For the first few years, he pruned only with thumb and finger. After the first five years, it was necessary to use the knife sometimes, and, as the tree grows, it may be necessary to cut large limbs, which should be done in October and November. You will then have no need to use paint, and you will not be likely to be troubled with water sprouts. He did not believe in going into the head of a tree and thinning it out till the limbs of the tree stood out like hoop-poles.

ON VEGETABLES.

MR. HOLLISTER spoke of the depredations of the black flea on cabbage and radish plants. They were never known to be so destructive as this year. It has been almost impossible for our gardeners to save their plants. He has been told, now that the damage had been done, that this was the black flea year. He regretted that he had not been posted sooner.

THE SECRETARY stated that he had been duly warned that this was not the year to plant cabbage and sow radishes; but, like many other sinners, he heeded not the voice, and planted both, and now walks a sadder but wiser man!

MR. TINDALL, being now called upon, made the statement that it had been his observation and experience, for the twenty years past, that the cabbage flea comes in force every other year. They may come every year, but the more serious depredations are made every other year, and he governs himself accordingly; that is, he asks the flea when he may plant cabbage. This year he planted none, as it was the insect year.

JUNE MEETING.

The June meeting of this Society was held at the residence of Col. W. H. FULKERSON, in Jerseyville, on the 1st inst., and was well attended. Col. F. is one of the best farmers in Jersey county, and he knows how to entertain his friends. His farm embraces several hundred acres of land, and his residence cost $20,000. His barns, out-houses and all the appointments of the place are in keeping with his wealth and good reputation. There were no essays and no meditated discussions—only the freest and easiest kind of talk.

ENTOMOLOGY.

President Starr called Prof. Riley to the floor upon this subject. He replied that he had no set report to make; he yet talked for half an hour upon the subject of the army worm, whose complete history is now known for the first time. The theories of Dr. Walsh and others that this insect laid its eggs in the fall at the roots of grasses is a mistake. It lays its eggs in the spring and upon the blades of grasses, whether green or dry. He proceeded to give a history of this insect and the means for its destruction.

He called special attention to the depredations of a worm that is destroying the raspberry crop about Collinsville. Helebore is a remedy, when it can be administered properly and in time. He was trying other remedies, and might have something further to report by and by.

President Starr inquired about the suggested biennial coming of the cabbage flea.

Prof. Riley begged to be excused from accepting any such conclusion, without further evidence. The history of this insect is not as well known as it should be. If it takes two years for this flea to develop, some one must give us its full history and tell us where it hibernates. He felt that it was a reproach, almost, that we did not know more about this insect.

THE ALTON HORTICULTURAL SOCIETY TWENTY YEARS OLD.

The Secretary read the following letter, received from Hon. W. C. Flagg, of Moro, which was ordered to be published with the minutes:

Moro, May 27th, 1876.

O. L. Barler, Upper Alton.

Dear Sir: I have run across the inclosed item, of quarter-centennial history, which may be used to prove that the Alton Horticultural Society is twenty-five years old; and, in any event, will be of interest to the members. I have heard intimations of such an early organization, but never found any documentary proof of it, till I accidentally came across this.

Truly yours, W. C. FLAGG.

THE ORIGINAL ALTON HORTICULTURAL SOCIETY.

In *The Prairie Farmer* for June, 1851, it is stated that "a Horticultural Society has been organized at Alton, with the following officers." With the spelling corrected, these are:

President—David [J.] Baker.
Vice-Presidents—G. W. Long, Lyman Trumbull, Charles Howard.
Treasurer—Eben March [Marsh].
Recording Secretary—George S. [T.] Brown.
Corresponding Secretaries—E. S. Hall [Hull], Amos [A. A.] Hilliard.
Council—R. K. Heart [B. K. Hart], N. G. Edwards, B. F. Long, Edward Keating.
Committee on Fruits and Flowers—S. Y. McMasters, Norton Johnson, Thomas G. Starr, E. D. Lapping [Topping] and James Chalmers.
Committee on Ornamental Trees—James Bailache, J. W. Schwappe [Schweppe], B. L. Dorsay [Dorsey], Robert Smith and John Atwood.

Dr. Long—This is a god-send to me. I am glad to hear that. That sustains me in a statement I made at the State Horticultural Society's meeting at Normal, some time ago. I there said that the Alton Horticultural Society was the oldest organization of the kind in the State. It was questioned, and refused publication in *The Prairie Farmer*. I was not prepared to follow up the assertion, for I had not the scratch of a pen to sustain me. But now we have it. I am glad to get that.

THE OCTOBER MEETING.

The Society met at the house of Dr. James, Upper Alton. President Starr in the chair; E. Hollister, Secretary *pro tem.* Minutes of previous meeting read, and amended, with regard to reported statement of Dr. Long, as to our Society being the oldest in the State, etc. "The State Society did not refuse to publish, and *The Prairie Farmer* omitted to do so by an oversight."

Our Secretary, having moved away, sent his resignation, which was accepted, and the following resolution, offered by Mr. H. G. McPike, unanimously adopted:

Resolved, That we part with Prof. O. L. Barler, as Secretary and member of the Alton Horticultural Society, with feelings of profound regret. The best wishes of the members will go with him to his new home.

Mr. E. HOLLISTER was then elected Secretary, to fill the vacancy.

The meeting then listened to the usual reports and discussions on Orchards, Orchard Fruits, Small Fruits, Vegetables, etc.

THE JANUARY MEETING.

The January meeting was held at the residence of E. HOLLISTER, at which time the annual election of officers took place, and resulted as follows:

President—Col. W. H. FULKERSON. *Vice-President*—W. L. LYON. *Secretary*—JAMES E. STARR. *Treasurer*—D. STEWART.

THE FEBRUARY MEETING.

The February meeting was held at the residence of F. K. NICHOLS, Esq., Alton. President FULKERSON presided, and the usual business was transacted.

Warsaw Horticultural Society.

JANUARY MEETING.

The first meeting of the year 1876 was held at Dr. J. W. Hollowbush's office, in Warsaw, on the 12th inst. Both presiding officers being absent, Capt. W. S. Hathaway was called to the chair.

At this meeting the work of the new year was vigorously entered upon, and while there was some time spent in recounting the disasters and discouragements of the past year, all seemed to be determined and hopeful for the future.

B. Whitaker, Esq., read before the Society a very comprehensive essay on Corn, which elicited a very extended and general discussion.

Mr. Hathaway said no man ever saw Indian corn growing wild in America.

Mr. Whitaker claimed it was found wild in various places in the western hemisphere.

Mr. Hathaway read a paper to show that the origin of our great Illinois cereal was still a mooted point, and said that though its origin was generally attributed to America, he could find no positive evidence to sustain it. He admitted it was cultivated by the American Indians, and instanced one field alone found in what is the present State of Maine, of 300 acres, cultivated by the native Indians. He said he could find no account of its origin in this country, and that it was not known in Europe, Asia or Africa before the discovery of America; thinks that history is silent with regard to the origin of this valuable cereal.

A number thought corn was discovered growing wild in Paraguay, by Humboldt.

Mr. Hathaway—The Paraguay corn, or any other known account of its origin, is incorrect.

Dr. Hollowbush said all writers of note, and all authority on the subject, agree in its being of American origin. It has only been *found* in

this country, which is good evidence of its origin. It was well understood that corn, as well as the so-called Irish potato, the tobacco plant, and many other valuable plants, were of American origin.

Mr. Whitaker said he could cite abundance of evidence of the general cultivation of corn among the Indians hundreds of years ago.

Dr. Warner said he was well satisfied of its origin; all authority credits it to America. He did not believe in the idea of spontaneous production, and thought the corn discovered by Von Humboldt had the characteristics of a small flint corn.

Mr. Spitz believed that corn was cultivated in America thousands of years ago, even before the flood, as he had found, in working a stone quarry near La Prairie, in Adams county, Ills., both *stalks* and *ears* of corn, of full size and perfect in appearance, in a petrified condition and imbedded in a strata of sandstone four feet in thickness, and that it was just like our Indian corn.

Dr. Hollowbush—That is proof enough of its antiquity.

Mr. Whitaker thought it might be of comparatively recent origin, as stone was still in rapid process of formation.

Dr. Warner thought sandstone was now forming in some instances; that near the mouths of great rivers, owing to the great pressure of water, it would only require volcanic action to produce the formation of sandstone.

A running discussion ensued in regard to dates, periods, mound builders, etc., in which several other members participated. From which we conclude that corn was in cultivation among the nations before the discovery of America; that it is now cultivated in most parts of the civilized world, where the climate will suit, and that its value to the human family is almost beyond computation.

The usual variety of subjects were discussed at the meeting, but we have space for only a few of the best papers and suggestions.

FEBRUARY MEETING.

Society met at the office of Dr. J. W. Hollowbush, in Warsaw.

All the officers of the Society were present, horticultural friends for miles in the country were in attendance, and members were out in full force. Indeed, we have seldom had a more satisfactory meeting.

PRUNING.

The special subject for the day was called up. Mr. BROWN, essayist for the day, being absent, Capt. W. S. HATHAWAY, who has made pruning an especial study, entertained the Society. Said he had tried pruning at all seasons of the year, spring, summer, autumn and winter, but finds that all trees pruned in June and July let out none of the sap, and that they will heal readily.

A long and interesting discussion followed Mr. HATHAWAY's remarks.

NEW APPLES.

PRESIDENT HAMMOND referred to a communication in *The Rural Messenger*, as to some new apple being wanted in place of Ben Davis. Thought it a pertinent question, as many are wanting to plant.

W. N. GROVER thought this Society and region want an original apple; would suggest the propriety of several members starting a nursery of seedling apples, seeds to be taken from choice varieties, and cultivate about a thousand trees each, and if this were done, out of the whole we will surely get a better apple than we now have, and thus accomplish a public as well as a private good.

Several members approved Mr. Grover's suggestions, and thought there was a possibility and probability of some good resulting from the experiment.

On motion of Vice-President PIGGOTT, it was agreed that this subject was of sufficient importance to be called up at another meeting.

MARCH MEETING.

Society met at the office of Dr. HOLLOWBUSH, in Warsaw, March 15, 1876. The attendance of members was not large, but the meeting was brimful of life, and the discussions practical and interesting. The Vice-President, J. L. PIGGOTT, Esq., called the meeting to order at one o'clock, P. M.

Dr. HAY, essayist of the day, gave way to HOMER D. BROWN, Esq., who read before the Society a very practical essay on the Peach, from which we are permitted to make extracts. Mr. B. said, "The peach is one of our finest fruits; although not a sure crop, it is a paying one. The surplus can always be dried or canned, thus making a healthful and delicious

sauce for the winter and spring months; and then, when our peach crop fails, it is very gratifying to get ahead of a cold winter by opening a can of fine peaches, nearly as good and fresh as when on the trees. In this locality we have an advantage over growers of more favored climes, for when we have a crop they cannot ship peaches and compete with us, as boxing and freight take off the profits; besides, the same peaches, boxed and shipped, will not bring as much as if taken from the trees and marketed the same day." Here Mr. Brown gave an account of his experience with almost all the known varieties of budded peaches, as well as seedlings; summing up as follows: Would plant only budded kinds, and few varieties; Hale's Early, Colridge's Favorite, Old Mixon Free, Lemon, Bergen's Yellow, Indian, Red-cheeked Molocton, and Heath Cling. And if fewer varieties were planted, would favor Hale's Early, Bergen's Yellow, Red-cheeked Molocton, and Heath Cling. Said he would not try the seedling experiment again, as budded peaches are just as hardy and productive, and then you know what you are to get, if you get trees true to name. Would plant sixteen to twenty feet apart on dry ground, trimming up to a straight stem, three feet high, so as to form a good head; avoid forked trees; cultivate in hoed crops for one year, then seed down to clover. The trees will need after attention. The borer must be kept out by examining often, and taking out with the knife while yet in the outer bark. Head back, but never dig up an injured tree before leafing time, no matter how bad the tree may look, but cut back, and, in nine cases out of ten, you will be rewarded by peaches on the new growth the next peach year.

APRIL MEETING.

The April meeting of the Warsaw Horticultural Society was held at the City Hall in Warsaw, on the 12th inst. The attendance was not only large, but select—that is, the tried "old wheel-horses" were on hand, and the discussions were full of interest. Our members are a class of students, inquiring after successful horticultural knowledge. And I think any one attending these meetings cannot fail to be convinced of the earnest work and the beneficial results of these meetings.

Vice-President PIGGOTT called the meeting to order at 1 o'clock.

CHARLES HAY, M.D., read an essay on Ornithology and Entomology, which we would be glad to give, but its great length forbids.

THE MAY MEETING.

The Society met at the new City Hall, May 10, when, with the usual variety of horticultural discussion, President HAMMOND read the following essay on

HOME ADORNMENT.

Webster defines Landscape Gardening as the art of laying out grounds and arranging trees, shrubbery, etc., in such a manner as to produce the most pleasing effect.

It is supposed by many that only the man of large estate and ample means can practice this delightful art. But this is an error that our horticultural societies should correct, and prominently set forth the fact that any farmer or owner of a town lot may and should practice something of ornamental horticulture.

The man who rears his stately mansion, in the midst of his hundreds of acres, has the opportunity to display much of taste and skill in the management of his grounds. Here the road winds among groves and clumps of trees, or is overhung by luxuriant vines, or unexpectedly crosses a rustic bridge. Now the visitor loses himself in a miniature forest of evergreens, or stumbles unexpectedly on a pile of moss-covered rocks, or is charmed by the splash of the tiny waterfall. Trees and plants from every clime meet his astonished view, and at every turn scenes of new beauty present themselves. But we, in our poverty, have nothing to do with landscape gardening in this sense of the word, but will speak of it in its adaptation to our wants as farmers and villagers.

The first great act in the history of mankind transpired in a garden. Beneath the luxuriant trees of Eden, God gave to man his "first best gift;" and—sad to relate—in this blissful spot the happy pair listened to the voice of the tempter and fell, and were banished from their blessed home. And in all his wanderings up and down the earth for six thousand years, man has looked back with intense longing to his first estate. And as he advanced in civilization, intelligence and culture, has sought to make his home approach as near it as possible.

The various stages in the development of any people may be traced by their advancement in agricultural and horticultural science. To provide food is the first great end to be accomplished; and until this is done no culture of the mind can be thought of. And it is a deplorable fact, that there are many, even in this land of plenty, who can never get beyond the bread and butter struggle, and, therefore, find no time for social or intellectual improvement.

When assured of his food supply, man begins to provide himself with the luxuries of life, and plant gardens and orchards and vineyards. These things secured, he feels another want. His home is dreary and cheerless.

His children have nothing to minister to their higher natures or æsthetic tastes. His sons are restless and dissatisfied, and long for the time when they can leave the paternal roof and plunge into the seething vortex of the city. His daughters are frivolous and unhappy, and desire to turn their backs upon the coarse and uncongenial home.

If he is a wise man, he takes in the situation at a glance, and makes haste to improve it. He removes all unsightly and disagreeable objects to a proper distance from the house; the pig-pen is banished to a distant corner; the wood-pile is removed to its proper place; and the yard and lawn, which have been used from time immemorial as a pasture and stock lot, are carefully planted with trees and shrubs. And this place, which was so lately the picture of desolation, will soon become a bower of beauty—a home which the children will love with all the ardor of youthful affection—around which will cluster a thousand pleasant memories—and to which they will look back with pleasure in all their weary wanderings through life.

"But," says farmer A, or neighbor B, "I don't know what to plant to produce the best effect." Well, we will tell you. First, plant evergreens; and don't be afraid of planting too many. The following are the most desirable—in the order named: Norway spruce; Scotch, white and Austrian pine; black spruce, arbor vitæ, fir, hemlock and red cedar. The savin and Irish and trailing juniper are very interesting small trees, or shrubs, and should have a place in every collection.

Deciduous trees must also have a place; and here considerable judgment is required—as trees of a large growth, like the elm and linden, should not be placed too near the house, or where they will overshadow other interests. Among the most desirable trees of this class are the chestnut, walnut, white and mountain ash, maple, larch, tulip tree, cypress (deciduous), magnolia acuminata, linden and elm. There are many others worthy of attention; but these will do for a beginning. A place should also be found for a variety of shrubs, vines, roses and other flowers—when the picture will be complete.

Those who have given the subject no attention have little idea how cheaply such a plan of ornamental planting can be accomplished, nor how much it will add to the beauty of their homes, the comfort of their families, and the intrinsic value of their property.

This society has not heretofore felt itself justified in doing much in the way of giving instruction or encouragement in this pleasing branch of horticulture; but the time has now come when it should take hold of the work. And, if true to itself, we may, in a few years, have the pleasure of seeing many of our rural homes, that are now as cheerless as the desert of Sahara, made beautiful by the touch of this magic art.

At this meeting Secretary JOHNSON read an essay on Landscape Gardening, and G. P. WALKER read a paper on Orchard Planting, which we are compelled to omit, although worthy of a place in this connection if we had room for them.

THE AUGUST MEETING.

The August meeting was held at the residence of Dr. ENO CHANDLER, of Wilcox township, on the 9th instant. The meeting was largely attended, by the most intelligent farmers and fruit-growers of this region, all of whom evinced an interest in crops and fruit.

The ladies, of whom there were many present, availed themselves of the season of flowers to grace the Society's table with a large display of the most beautiful and fragrant flowers. Bouquets by Mrs. D. HALBOUR, Mrs. A. C. and Mrs. S. J. HAMMOND and Mrs. ROBERT MCMAHAN, were very attractive.

A large and magnificent display of apples was made by President HAMMOND, HARLOW HAMMOND, CHARLES AMES, E. MCCUNE, ISAAC BLISS, SEABURY CHANDLER, W. N. GROVER, W. S. HATHAWAY, and many others.

At this meeting Mr. W. S. HATHAWAY read a carefully prepared paper on the subject of Tree Blight, which was followed by discussion.

THE OCTOBER MEETING.

October meeting was held the 14th inst., at "Montebello Farm," at the residence of C. F. DARNELL, Esq. A moderate attendance of working members and some visitors were present and an interesting and profitable meeting was had.

President HAMMOND called the meeting to order at 10 o'clock, A. M., and proceeded to business.

The special subject of

FLORICULTURE

Was taken up, and a most excellent essay upon the subject by Mrs. Dr. J. J. TAYLOR was read before the meeting, and the subject was well discussed by the members present.

THE NOVEMBER MEETING.

At the November meeting the subject of the essay was Farming, or Mixed Husbandry, by Mr. J. S. JOHNSON, which, of course, awakened discussion. The meeting was pronounced a success.

Jacksonville Horticultural Society.

REPORTED BY A. L. HAY, SECRETARY.

OFFICERS FOR 1876.

President—Hon. Edward Scott.
Vice-President—B. H. Chapman.
Secretary—A. L. Hay.
Treasurer—Miss M. E. Catlin.

FEBRUARY MEETING.

The Horticultural meeting held at the Court House, on Saturday evening, proved one of unusual interest to all present.

Mr. Heinl took time by the forelock, and the Society by surprise, by stealing into the court room at an early hour, and filling a table with choice flowering pot plants and a magnificent collection of cut roses.

A lovely fuchsia, less than three months old, burdened with opening buds, attracted considerable attention. This plant came from the East, as something new, under the name of "Mrs. Marshall," or "The Widow Marshall;" but Mr. Heinl recognized it as an old variety, in cultivation for many years. He declared that those Eastern men were running "crooked," and he ought to and would "squeal."

Another investigating committee is now in order, and Heinl had better buy a ticket for Canada.

Mrs. KELLOGG exhibited a beautiful bouquet of wild flowers, gathered recently in California, while the snow from the mountain tops was being blown into the face of the friend who gathered them.

At rather a late hour, Capt. KEISER came puffing into the room, burdened with a gigantic hyacinth, bearing a flower stalk nearly eighteen inches in length. The house was immediately filled with a delightful fragrance, for which the people were, for a time, at a loss to decide whether the Captain or the hyacinth was responsible; but, upon investigation, it was decided that the plant, and not the Captain, should wear the laurel.

Mrs. DEWEESE, from the Committee on Horticulture, then took the floor (or rather a chair), and read an essay upon the Care and Cultivation of House and Bedding Plants.

A long discussion upon this and other subjects occupied the time of the meeting.

JULY MEETING.

The currant tree, rooted and grounded in the fruit of its own production and placed near a window early in the evening, by Mr. ROBERTS, drew a large crowd of people into the County Court-room before the time for calling the meeting to order had arrived; and the great array of small fruits and flowers, placed a little further back, succeeded in holding them there until the clear, shrill voice of the President commanded attention.

Small Fruits—the subject before the meeting for consideration—was fully and freely discussed by the different growers in the vicinity.

Mr. CHAPMAN opened the ball by calling attention to the rapid increase in the consumption of small fruits in our own city. Ten years ago 100 boxes of strawberries completely glutted this market, while now thousands of them were consumed daily during their season, and for years he had not heard the cry, "Hold, enough;" and the increase in the demand for other fruits was equally as great; while the decrease in sickness, so very common during the summer months, was a subject worthy the consideration of every head of a family. Rotation in fruits, like rotation in office, was greatly to be desired, and he would open the season with an early variety of strawberry—say Brooklyn Scarlet, followed by the Wilson's Albany, then the Green Prolific—which provided a supply of choice

fruit until the Davidson's Thornless raspberry made its appearance. Next comes the Doolittle raspberry, following it the Seneca, then the Miami; just as these blackcaps are retiring from active business, the Turner Seedling steps blushingly to the front and bridges the chasm between them and the blackberry.

In planting the raspberry, the tips of the preceding year's growth should always be used and planted in rows six feet apart and four feet apart in the rows. Give careful cultivation the first year after setting, and a good crop of fruit might be expected the succeeding summer. The plants would require some support during the fruiting season thereafter, especially on rich, loamy soil.

The red varieties were propagated from suckers. The Turner Seedling, one of the best varieties, sucked entirely too much for the good of the parent plant, and they should be slaughtered without mercy, either by plowing or hoeing, as the limits of the field demanded.

Mr. Massey reported a heavy crop of blackberries now ripening. He agreed with Mr. Chapman's views in regard to the cultivation and varieties of small fruits, and reported some rot making its appearance in grapes, which he attributed to disease of the vine, but looked to no serious results from it. He exhibited several varieties of tomatoes, the pear-shaped and Canada Victor, and a very large, smooth, new variety, called the Governor Hayes. Another, which had given general satisfaction whenever tried, was called the General Grant, and a small, wrinkled variety, not recommended for trial, called The Tilden. (N. B.—He had no allusion to the presidential nominees.) He also exhibited raspberries, currants, German wax, beans, rhubarb, cabbages and other vegetables.

Mr. Baldwin brought Miami, Seneca and Doolittle Black-cap raspberries, also Tower's Seedling, a red variety introduced by himself, and Early Richmond and English Morello cherries.

Other parties also made exhibitions of fruit, and engaged in the discussion.

OCTOBER MEETING.

The regular monthly meeting of the Horticultural Society was held at the Court House on Saturday evening.

The President, Judge Scott, was in the chair.

The Treasurer reported that the receipts of the exhibition were $51. The expenses, fortunately, covered the receipts, so that there being nothing to quarrel about harmony reigns in the horticultural world.

Mr. J. E. SAWYER sent twenty varieties of winter apples, which were very large and fair. The committee adjudged the premium, offered by Mr. GRASSLY, of twelve loaves of bread, to Mr. Sawyer. The names of these varieties opened up a new vocabulary to the members present.

There was considerable discussion on Orchard Fruits, and kindred subjects.

NOVEMBER MEETING.

At this meeting Mr. B. H. CHAPMAN read the following essay:

THE CULTIVATION OF THE GRAPE.

No doubt more has been written on the cultivation of the grape than any other fruit, since the spies brought it from the land of Canaan. No wonder they were delighted with a country so prolific of grapes. See the wisdom and kindness of God in giving a grape-growing country to His chosen people. I do believe the grape is the best, as well as the most profitable, of all the fruits; and the doctors say the most healthy. The grape, as well as the beautiful apple, has been the delight of Christian writers from ancient date. And the slothful husbandmen (in the parable) were upbraided, when the owner of the vineyard came for grapes, but beheld the wild grapes. So now, if we expect good grapes, we must give them careful attention and good cultivation, or we shall have worse than wild ones. And now we come to our subject, the Cultivation and Care of the Vine. To this intelligent audience I need not say much of the preparation of the ground. I would say, select high, rolling ground as a site for your vineyard. If clay subsoil, lay five-inch tile drains as near as twenty or thirty feet, and three feet deep. Next, subsoil deeply. The best exposure is that which slopes gently towards the southwest, a southern inclination being preferable. Now lay off your ground in rows. I planted my vines six feet in row, and rows six feet apart; am satisfied they are too near. I think, for strong-growing vines, rows eight feet apart and ten feet in the row better. Let the rows run north and south. The vines must have sun and air, to be healthy and to produce good fruit. Do not allow a spear of grass or a weed to grow in your vineyard. If your ground is not much rolling, ridge it a little for the row, then work the soil a little towards the vine, making a little sag between them, so as to prevent the water from settling to the roots. No grape vine will be healthy long if its roots are water-soaked, either in

garden or vineyard. Do not plant vines on low, wet, clay subsoil. Plant good, strong, two-year old vines from cuttings of well ripened wood.

Variety.—We should choose first the variety which has given the best satisfaction in the State or county in which we live, or the nearest locality to us. I will name a few of the most prominent: The Concord appears to have given the most general satisfaction all over the country, and seems to be the grape for the million. The Delaware is highly recommended by Eastern authorities. Here at the West it has proved a failure in most localities, being subject to leaf-blight, and is a feebler grower. Hartford Prolific. This is immensely productive, and fruit of fair quality here, hardy and healthy.

The first summer, after planting, keep the ground mellow and free from weeds, stirring freely with hoe, rake, plow and cultivator. Second year, prune to two buds of last year's growth. Cultivate well from four to six inches deep. At the commencement of the third season we find our vines pruned to two spurs of two eyes each, and four lateral canes of from four to six eyes each. These are tied firmly to the trellis. The discussion of trimming or summer pruning would require too much time for the present occasion.

Let me say again, in conclusion, sun and air are the life of the grape. The sun must shine on the ground at the roots and on the canes of the grape-vine, to make them healthy and produce good fruit. We cannot grow good grapes among the trees of this beautiful city, as they (the trees) are now trimmed.

Champaign Co. Horticultural Society.

REPORTED BY C. I. HAYS.

OFFICERS FOR 1876.

President—Prof. T. J. Burrill.
Secretary—C. I. Hays.
Treasurer—Mr. Avery.

MAY MEETING.

The May meeting was held at the residence of Mr. Cunningham.

The business of the meeting was to discuss the best means for destroying the canker worm in the orchards, and to eat a sumptuous dinner provided by "mine host."

JUNE MEETING.

The June meeting was held at the residence of Mr. S. Stewart. At this meeting it was agreed to reduce the number of these meetings to six for the year, instead of holding them monthly, as heretofore. The subject of Bugs, and especially Grubs, was the principal feature of this meeting; Prof. Burrill giving the light of his countenance and counsels on the occasion.

JULY MEETING.

Society met at the residence of Mr. S. Avery, Champaign.

Mr. Avery read an excellent essay on the subject of Small Fruits, which was not received for publication. There was some discussion on small fruits.

AUGUST MEETING.

The Society met in the grove near Urbana. Mr. ADAMS read an essay on Our Native Birds, followed by discussion. But few members present, because of absence at the Centennial.

SEPTEMBER MEETING.

Society met at the residence of S. FAULEY. Mrs. C. E. LARNED read an essay on the Kitchen, which was pronounced excellent.

Prof. BURRILL gave a talk on "Horticulture at the Centennial," illustrated by photographs.

A good dinner always ends these meetings, of course.

OCTOBER MEETING.

Society met at the residence of Mr. A. O. HOWELL, at which the following report was read:

President of the Champaign County Horticultural Society:

As a final report upon the Grub and Cut Worms, your committee present the following:

At the first our information was derived from the members of our association; but, considering the importance of the subject, recourse was had to outside parties. The most prominent men in the ranks of horticulture were written to, and, from the most, replies received. All agree in stating that dry years are favorable to the production and appearance of these pests, and that some localities seem more frequently attacked than others. The grub worm must be fought in a different manner from the cut worm. The beetles of the former may be killed whenever opportunity presents, and thus the source is at once cut off. There is no mistaking the mature insect, its dark brown or chestnut-colored and shining wing-covers, and humming noise when flying (which is at night), sufficiently describe it. When a field is attacked by the grub or larvæ, the best remedy is to plow it up in the hot months of July or August, or else as late in the fall as it can be done. This destroys them in three ways: they are scorched to death by the sun's rays in July, or frozen by December's cold; deprived of food, and starved; and eaten by birds. In the above methods, the eggs (which are laid in the ground) are destroyed by the excessive heat, severe cold, and by birds.

The mature insect of the cut worm flies by night, and is a moth about one inch broad across the wings, and of a grayish appearance. These may be destroyed in great numbers by burning heaps of brush and other material at night, to which they are attracted by the light. The larvæ, which does the cutting or damage, may be destroyed in the same manner as the grub worms. When a few plants only are attacked, the best method is hand picking. A few chips put on the ground near the affected plants afford a shelter for them, from which they may easily and quickly be gathered and destroyed.

C. I. HAYS,
H. J. BEECHER, } Committee.
A. P. FAULEY,

OFFICERS OF CENTRAL HORTICULTURAL SOCIETY, FOR 1877.

President—A. C. HAMMOND, ... Warsaw.
Vice-President—J. W. ROBISON, ... Tremont.
Secretary—D. B. WIER, ... Lacon.

OFFICERS OF SOUTHERN HORTICULTURAL SOCIETY, FOR 1877.

President—E. HOLLISTER, ... Alton.
Vice-President—F. HAYDEN, ... Alton.
Secretary—J. E. STARR, ... Elsah.

APPENDIX

TO THE

Illinois State Horticultural Society's Report.

Illinois State Horticultural Society.

ANNUAL MEETING FOR 1877.

The next Annual Meeting of the Illinois State Horticultural Society will be held at Ipava, Fulton county, on Tuesday, Wednesday and Thursday, December 11, 12 and 13, 1877.

By order of the Board.

O. L. BARLER, *Secretary.*

July 3, 1877.

MEETINGS OF EXECUTIVE BOARD.

A meeting of the Executive Board was held at the Union Hotel, Galesburg, December 14th, 1876, by call of the President. The only business transacted was the issuing of sundry warrants to pay the indebtedness of the Society—as indicated in Financial Statement of this date. The Board adjourned to meet at Springfield on the second Tuesday in January, 1877.

Adjourned. O. L. BARLER, *Secretary*.

MEETING OF THE BOARD AT SPRINGFIELD.

The Board met at the Agricultural Rooms in the State House, Springfield, January 9th, 1877. There were present at this meeting: Dr. A. G. HUMPHREY, J. W. ROBISON, A. C. HAMMOND, E. HOLLISTER, H. C. GRAVES, O. L. BARLER.

After some general talk upon the matter of the finances of the Society, the meeting proceeded to make up the programme of work for the year, as indicated elsewhere in this report.

Adjourned.

O. L. BARLER, *Secretary*.

TUESDAY EVENING, JANUARY 10TH.

The Board met in the Agricultural Rooms. The only business transacted was the appointment of Messrs. A. G. HUMPHREY and H. C. HAMMOND to return to Springfield, at a future date, if necessary, and labor to secure the usual State appropriation of $2,000 annually.

Adjourned.

O. L. BARLER, *Secretary*.

FINANCIAL REPORT

For the Year Ending December 14th, 1876.

RECEIPTS.

1875.			
Dec. 14.	Balance on Hand (See vol. 9, page 65)	$1203	55
" "	A. C. Hammond	75	00
" "	J. R. Robison	75	00
" "	O. B. Galusha	75	00
" "	L. K. Schofield	75	00
" "	H. C. Graves	75	00
" "	Amount of Membership Fees	95	00
" 16.	F. K. Phenix (Bouquets)	6	00
" 23.	Cash for Books Sold	5	00
1876.			
	Amount of Appropriation for 1876	2000	00
Mar. 6.	Hollingsworth (Expressage Returned)	3	50
" 6.	S. G. Minkler, for Book	1	00
" 10.	Dr. Butler, for Books	3	50
Apr. 7.	Albert Dunlap, Treasurer Central Society	11	00
May 10.	Books Sold	2	00
Sept. 22.	A. C. Hammond	4	50
" "	One-half Premium Paid State Fair	12	50
Dec. 14.	Membership Fees	67	00
		$3789	55

EXPENDITURES.

1875.			
Dec. 16.	C. E. Southard, Printing Programmes	$ 19	75
" "	O. B. Galusha, Salary and Expenses	291	17
" "	Rent of Room for Use of Society	4	00
1876.			
Jan. 4.	O. L. Barler, for Reporting Services	65	00
Feb. 2.	Baker & Co., Engraving	13	85
" 16.	C. E. Southard, Printing	15	25
Mar. 3.	C. E. Southard, for Printing and Binding 1,000 Vols. Transactions,	1299	05
" 3.	C. E. Southard, for Engravings, Diagrams, Boxing, Carting Books,	45	00
Aug. 10.	O. B. Galusha, Secretary's Expenses	53	00
" "	O. B. Galusha, Expenses	32	00
" 12.	C. E. Southard, Printing Circulars	2	50
" 19.	A. C. Hammond, Railr'd and Incid'tal Expenses in Service of Soc.	37	50
Dec. 14.	C. E. Southard, Printing Programmes	20	75
" "	J. W. Robison, Expenses Service of the Board	8	71
" "	A. C. Hammond, " " "	46	63
" "	R. C. Graves " " "	24	63
" "	L. K. Schofield " " "	40	15
" "	Paid for Draft		50
	Total Amount paid on warrants,	$2009	44
	Balance in hands of Executor of Huggins' Estate, $1745 75		
	" " S. G. Minkler, Treasurer 34 36	1780	11
		$3789	55

O. L. BARLER, *Secretary.*

Report of the Third District.

BY A. L. HAY.

The Third, or Illinois River Horticultural District of this State, comprising twenty-one of the principal counties in Central Illinois, and which, as a member of the Committee on General Horticulture, I am supposed to represent, is (I am sorry to admit, but a sad experience compels me to acknowledge the fact) clearly entitled to be known as the dead-beat district of the State—there being only ten of the twenty-one counties which feel enough interest in horticulture to have a representative in your Society.

In the early part of last summer I went to some little trouble and expense to purchase postal cards, and had published upon them the instructions given by you to said committee, and mailed one to each member of your Society living in said counties, and also to those living in other counties in the district, so far as I could learn the address of persons who would be likely to feel enough interest in horticulture to pay any attention to them, asking that reports might be mailed to my address in time for compilation before the meeting of your Society at Galesburg; and, up to the present time, I have received but two answers from them—one from Mrs. C. C. Pollock, of Mercer county; another from B. L. T. Bourland, of Peoria county, which you will find inclosed.

As for our own county (Morgan), I will say that the past has been a remarkable season for fruit of all kinds. With the exception of peaches, fruit crops (like the grasshoppers of Kansas) have been a burden.

At first, strawberries made an attempt to supply the demand for small fruits, so that a failure of the raspberry crop would not be felt; and had it not been for a severe drouth, lasting nearly six weeks, and extending entirely through the fruiting season, it would have been, in a great measure, successful. However, one-fourth of an acre of the Wilson's Albany, upon our own grounds, produced thirty-seven and a half bushels, or at the rate of one hundred and fifty bushels per acre. The raspberry, coming next in turn, endeavored to put the strawberry to shame, and the copious showers, which fell in due time, made it the largest crop of the kind ever gathered in this county. The market was not only bountifully and cheaply supplied, but hundreds and thousands of boxes rotted both on the market and in the field.

The cherry crop was also an enormous one. Fine large Morellos, free from insect injuries, and without stems, found slow sale at six cents per quart; while the Early Richmonds sold for two dollars ($2.00) per bushel, with stems, or $3.00 without.

The early apple crop deserved indictment as a public nuisance. They were so plenty and cheap that boys would not eat them. The children spitefully used and mistreated them, and boarders complained if they were placed upon the table as sauce or manufactured into pies. They rotted in such quantities that it was disagreeable walking through the orchard, and every one was pleased when the last one fell to the ground.

For the first time in a number of years the Lawton blackberry gave an immense yield, while the Kittatinny was not far behind in quantity, and rather took the lead in price when put upon the market. Lawtons sold as low as seven and a half cents per quart by the crate, and blackberry jam was jammed into every empty jug and jar to be found.

The yield of grapes was the largest known for years, the market being over-supplied, and prices away below zero. But the late crop was so badly damaged by the grape codlin, that, at the close of the season, well assorted Concords found a ready sale at seven and eight cents per pound.

Fall and winter apples were in large supply, and uncommonly free from insect injuries. This freedom from insect depredations can only be accounted for by the great scarcity of fruit the year previous, and the immense crop the surviving insects found to operate upon the past year.

The prospect for peaches was uncommonly good until a heavy frost, late in April, when an advance of one hundred per cent. offered for peach cobblers for August delivery found no takers; and a straggling peach, here and there, proved the extent of the crop.

The great scarcity of healthy pear trees in this county makes an over supply of the fruit impossible. There are but few trees to be found upon which the blight has not secured a foothold, and they must soon succumb to that great destroyer. One Buffum tree, thirty years old, in this vicinity, produced nearly twenty bushels of sound marketable pears the past season. Although the blight has, for a number of years, had a mortgage resting upon the top of this tree, it appears to be in no hurry to foreclose it, and, possibly, it may produce fruit for thirty years to come.

Plums, with the exception of a red variety supposed to be the Wild Goose, are always a failure here, and the past season was no exception to the rule. As soon as Prof. Riley, or some other entomologist, can invent a curculio with a steel drill attachment, with power to puncture the sheet-iron like skin of this variety, it will also become unknown in our market.

In the adjoining counties of Pike, Cass and Scott, the fruit crop was equally as abundant as here; and several wagon loads of very fine peaches from Pike were sold upon our streets.

Looking, then, over the past year, we can only pronounce it a very fruitful and profitable one to the horticulturist in this locality. As a whole, it has been remarkably free from fruit-destroying insects. The

short crop of the year previous giving them but little chance for reproduction and with boys in the orchard, which is getting to be pretty generally the custom in this county, and the use of common remedies, they have been kept under control, so that, with the exception of the damage to the late crop of grapes by the grape codlin, no serious results can be reported.

About the middle of June a slender, light green worm, about an inch and a half in length, made its appearance upon the raspberry plantation of Mr. Baldwin, of this place, and in a few days his entire field of twenty acres of the Turner Seedling was leafless, and just about as suddenly the entire field was wormless; a new growth of leaves soon covered the canes and the fruit was uninjured. This prevalence was not noticed at any other point, and Mr. Baldwin is very anxious to know why they had a spite against him, and whether or not they intend calling upon him next season.

It is pretty generally conceded, by persons of experience, that fruit grown upon our barren or sandy land is superior, in both flavor and keeping qualities, to that grown upon rich black soil, where trees and vines make a much more rapid growth. If this difference in the quality of fruit may be attributed to a difference in the growth of the plant or tree which bears it, then the remedy lies in the provision of a limited supply of food for fruit-bearing plants. Some cultivators overcome this difficulty by allowing a short, thick growth of weeds among their small fruits and in their vineyards; or rather they cultivate with the scythe instead of the plow. A timothy or blue grass sod appears to enforce rather too thorough a system of retrenchment; yet the best and most perfect crop of grapes I have seen for many years was ripened upon Concord vines, standing in a firm old timothy sod. So far as strawberries are concerned, the cultivator who induces the largest growth of plants will secure the largest yield of fruit, and, consequently, the most money from a given amount of land; but, further than that, the tendency of planters here is to devote their thinnest soil to fruit culture.

Within the past ten years the production of small fruit in this vicinity has more than quadrupled, while the population of the city or county shows no such comparative increase.

To be sure, a portion of this supply finds a market at other points, but the amount imported will more than double the quantity exported.

Ten years ago a box of small fruit grown outside the county could not be found in our market at any time; while now they appear to come from the four corners of the earth, and from the very first to the very last of the season, and must be brought into competition with fruit not more than two or three hours from the field. I cannot better illustrate the great change which has taken place in the consumption of small fruits in this county, than by giving the experience of Mr. Baldwin, one of our most prosperous growers of to-day.

Sixteen years ago he found it impossible to dispose of a few quarts of freshly-picked berries in our market at any price. Now, during the height of the season, he gathers as many as 3,000 boxes per day, while a

number of other growers are not very far behind him, with a great many smaller producers, who, with the exception of Mr. Baldwin, find sale for their entire crop here at home.

During the past two years the Deleware grape has been acting badly; covering itself with fruit, and, just before bringing it to maturity, the leaves fall and the entire crop is a failure. As the foliage had been entirely free from insect attacks, the excessive wet weather prevailing just at that time was supposed to have been the cause of such misbehavior.

The varieties of grapes considered worthy of cultivation in this county are annually becoming less, and those recommended by nurserymen for planting at present may be counted upon the fingers of a single hand. The Concord is always first in consideration; the Hartford Prolific has many friends; the Ives Seedling is growing in favor gradually; the Clinton is getting to be highly prized for its reliability and heavy crops, and the people have learned that it is not fit to eat until very late in the season, and then it really is good.

There is one orchard in this county which contains a hundred different varieties of apples, and there are many others which run past the fifties considerably. Experience has proven that for profit these lists might be greatly reduced.

Beginning with the early apples, my experience has been, that during the past five years the Red Astrachan has produced three very heavy crops, and they have always commanded the very highest market price. The Early Harvest is an excellent apple, and, as it fruits annually, it is considered the most desirable. The Red June is gradually losing its good name. As the trees of this variety acquire age, the fruit becomes inferior in size, and it will not sell when brought into competition with the former varieties.

For fall apples, the Maiden's Blush, Rambo and Snow (or Fameuse); winter, Wine Sap, Rawles' Janet, Pryor's Red and Newtown Pippin. I include the latter variety (although it scabs very badly) for the reason that it produces annual crops, keeps until May, and is admired by every one who loves a good apple.

The Northern Spy, Rhode Island Greening, Yellow Bellflower, Spitzenberg and Seek-no-farther, are all good apples, but very shy bearers, and will not keep longer than December, and the main part of the crop falls and is wasted before the picking season arrives.

If asked by any one, except the N. Y. Farmers' Club, to enumerate the worst enemies of the fruit-growers in this locality, I should head the list with birds. In early spring the robins come down upon us by the hundreds; the brown thrush, though not so numerous, is represented by a large family; the orioles take entire possession of some plantations; while the catbird is everywhere, and the blue-jay can be heard squealing his squall in every tree in the land; while the air is thick with woodpeckers of every style and color. To be sure, they destroy a great many insects during the early part of the season, but they make no distinction between our insect friends and foes. So that the value of their services, even at that season of the year, is a matter of considerable doubt. The

brown thrush is the only one in the catalogue which makes any effort to repay us in song for the fruit upon which they fatten themselves and rear their young, and I believe that a pair or two of them around a house during the summer season will not go south without leaving a balance in their favor, and be heartily welcomed upon their return in spring. But, if in return for the services of the others mentioned they destroy the entire fruit crop, as they do upon many small plantations, would it not be better to leave us the insects, and give us a slight show for fruit, than to step in, just as the harvest time arrives, and appropriate everything to themselves?

It is not uncommon here to see a flock of two or three hundred robins, after the breeding season is at an end, and when they settle upon a vineyard it reminds one very forcibly of taxation without representation. The cry from this quarter continually is, give us a less number of birds, or give us a voice in selecting them.

Report of the Fourth District.

BY ALBERT DUNLAP.

The horticultural interest in the Fourth District is receiving its usual attention, notwithstanding many of our commercial fruit-growers have not found it as profitable as they had anticipated. Nearly every farmer recognizes the importance of planting an orchard, as one of his first duties. Some of the first apple orchards planted are beginning to decay, but those set as early as 1858, that have received proper attention, are still profitable. The damage done by the late severe winters was not so serious as many anticipated, many orchards not showing any damage. Peach trees were mostly destroyed, and in some cases the Early Richmond cherry.

The fruit crop the past season was good, and the fruit quite free from insect depredations. Pears and peaches were a failure, the fruit having been injured by late frosts. Several extensive pear orchards have been planted in this district, but, so far as our knowledge goes, all have been destroyed by the blight, with one exception. Mr. H. C. Smith, of Tolono, in Champaign county, has a pear orchard of 1,600 trees, planted several years ago, that is still in good condition. The blight has killed some of the trees, but the vacancies have been filled each year. The orchard consists of standard and dwarf trees, but Mr. Smith now thinks

dwarfs the best, and has settled down to two varieties, viz.: Bartlett and Flemish Beauty. The profits have not been large thus far, but probably as good as from the same number of apple trees.

Grape growing is receiving a considerable attention. A few years ago our local markets were not supplied with this fruit, and fifteen to twenty cents per pound was readily obtained for Concords; but so abundant have grapes become, that this season only three to ten cents could be obtained. Concord is the leading variety grown, and the spiral system usually adopted in training the vine. Several vineyards of Ives' Seedling have been planted, but the first three or four years the amount of fruit produced has been small; but as the vines become older, they are more prolific.

Among the new varieties of fruit that promises to be valuable the Snyder Blackberry takes the lead. It seems perfectly hardy and bears annual crops, when the Lawton and Kittatinny fail.

The Charles Downing strawberry bears well, but ripens the berry in so imperfect a manner as to render it rather unsalable.

The Alexander peach is deserving of notice, having originated in this district, and promises to be valuable on account of its earliness.

The Codling moth has not been as plentiful as usual, owing, we presume, to the scarcity of fruit last year.

The Tent caterpillar was quite plentiful, and did a great deal of harm where left unmolested. Care should be taken to destroy the nests as soon as discovered.

The Canker worm was seen in some localities this year and last, and occasionally we hear of an orchard being badly damaged by this insect.

The Apple-tree twig-blight was quite prevalent, and injured the appearance of orchards very much.

Mr. J. B. PHINNEY, for several years past a member of this Society, and one of the largest orchardists in Central Illinois, died at his residence, near Champaign, in August of this year, after a protracted illness. Mr. Phinney came to Illinois, from Boston, in 1858, bought a large tract of prairie land, and engaged in farming and fruit growing. His orchards cover about one hundred and fifty acres and are surrounded by artificial belts of timber.

In his death horticulture loses one of its best workers, and the community an excellent citizen.

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